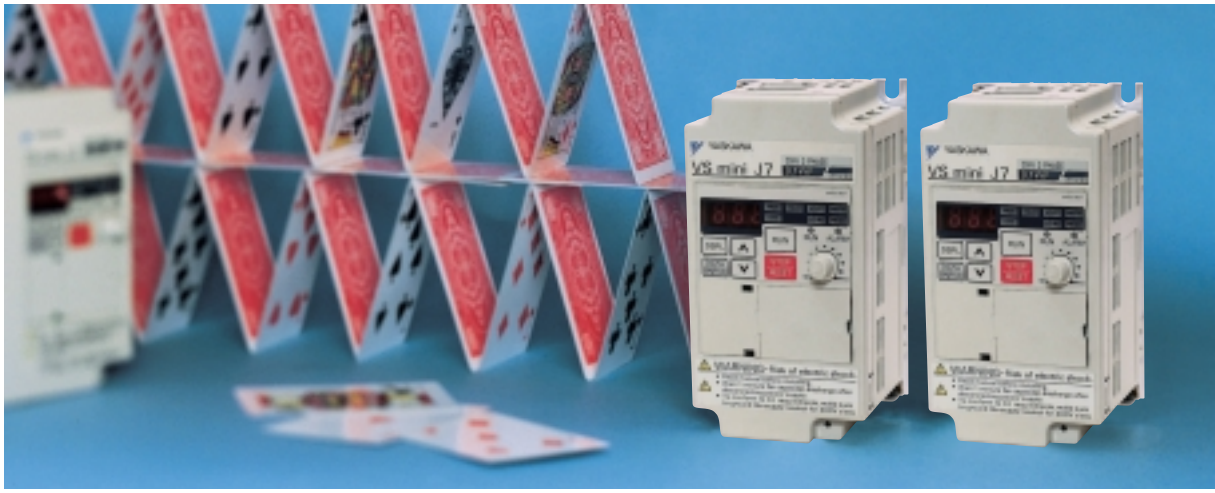
COMPACT INVERTER FOR GENERAL-USE

VS mini J7

200V CLASS (THREE-PHASE) 0.1 TO 3.7kW (0.13 TO 5HP)
200V CLASS (SINGLE-PHASE) 0.1 TO 1.5kW (0.13 TO 2HP)
400V CLASS (THREE-PHASE) 0.2 TO 3.7kW (0.25 TO 5HP)



YASKAWA

Certified for
ISO9001 and
ISO14001

JQA-0403 JQA-EM0498

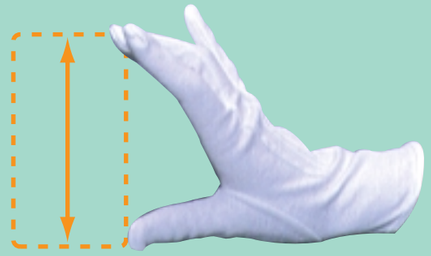
LITERATURE NO. KAE-S606-12E

Inverter Magic

Instant Upgrade for Your Small Machinery!

The VS mini J7 inverter delivers the solution for all those users who want to easily upgrade small machinery to variable-speed drives. Turn your machinery into the optimum drive through our powerful performance and rich array of functions. Try the compact, economical VS mini J7 for simple operation and maintenance.

Only 128mm Tall



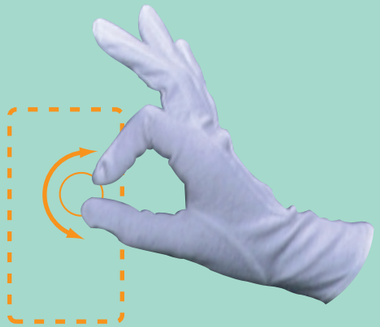
Compact design means it fits into your panel efficiently. And with global specifications: certified under UL/cUL and CE standards, they are available in both 200V (3-phase/single-phase) and 400V (3-phase) series. Power supply harmonics are also controlled so our inverters can be used safely anywhere in the world.

CE marking for European safety standards

c UL us LISTED
UL/cUL mark

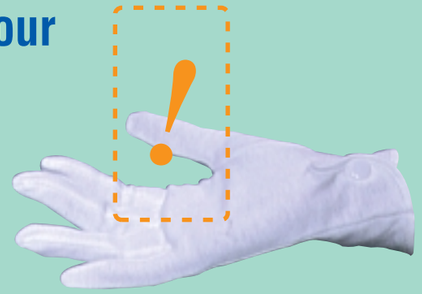
Note: When using CE standard inverters, the special EMC conformed noise filter is required. Contact your YASKAWA representative.

Simple Operation



The main circuit terminals are arranged in upper and lower rows, so you can wire it up just like a contactor. For operation, just turn the frequency volume setting knob. The entire design is user-friendly through-and-through, such as one-touch cooling fan replacement.

Upgrade Your Machinery



Because the motor can be fully controlled, it is easier than ever to adjust conveyor and mixer speeds, or pump and fan flow rates. Inverter functions deliver the optimum drive at a reasonable cost (see application examples on page 5). Just snap it on, and just like magic! Your inverter is transformed.

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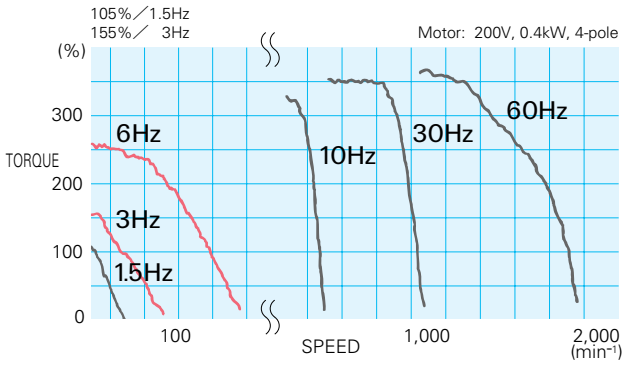
Major Features of the VS mini J7

1 Performance and Functions

Full-range automatic torque boost

●Delivers outsanding starting torque (150%/3Hz) for its class, for smooth machinery start-up.

Outstanding starting torque characteristics



Even for a single given machine, the required motor torque will vary with the load conditions. The full-range automatic torque boost function automatically adjusts V (voltage) in V/f as required. The VS mini J7 can adjust V for the required torque during acceleration as well as during constant-speed operation. The inverter calculates the required torque automatically.

Full range of protective functions

●High-speed current-limiting function minimizes over-current trips (above 250% of rated current) for enhanced tripless operation (restart after momentary power loss, stall prevention function, fault retry, etc.)

●Inrush current suppression circuit buit-in.

Diverse operating methods and functions

●Multi-step speed operation (up to nine steps), UP/DOWN operation and jog operation.

●Full range of functions, including slip compensation, overtorque detection and high-speed search.

Wide range of input/output

●Multi-function I/O terminals, 0-10V, 4-20mA or 0-20mA inputs, as well as analog monitors are available.

●Application freedom is increased since multi-function inputs can be set to PNP or NPN.

Supprot for RS-232C and RS-485/422 (MEMOBUS protocol) available as options.

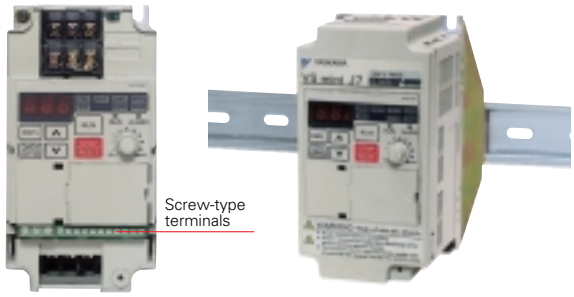
2 Operability

Simple installation and wiring

●The main circuit terminals are arranged in upper and lower rows, so you can wire it up just like a contactor.

●Main and control circuit terminals are screw-type, for simple wiring and improved reliability.

●One-touch mounting/detaching with DIN rail attachments.



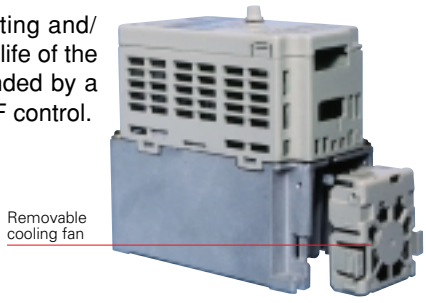
Just wire it up and run!

●Frequency volume setting knob located on the control panel (operator) as a standard feature. Immediate operation after you supply power.

●If remote operation is required, the optional operator and cable can be mounted on your control panel.

Simple maintenance

●One-touch mounting and/or detaching. The life of the cooling fan is extended by a cooling fan ON/OFF control.



Power supply high-harmonics suppressed

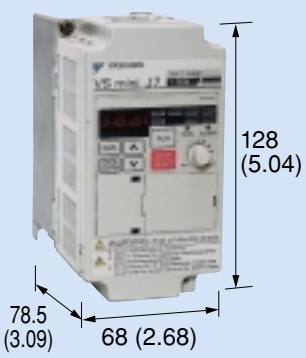
An optional DC reactor can be connected, and of course AC reactors are also available.

3★ Compact Size

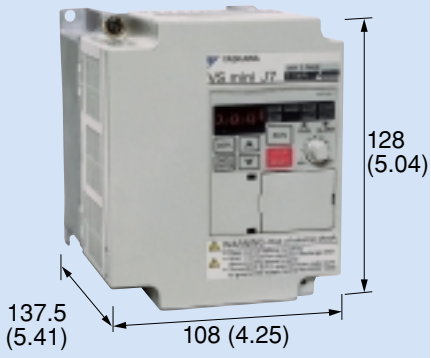
Efficient layout in panel

●Compact design means smaller volume requirements, and because dimensions are uniform for all 128mm-height (5.04 inches) models, your panel layout is simplified, too.

Dimensions in mm (inches)
(see page 9 for details)



(Example of 200V, three-phase, 0.1kW model)
200V 3-phase 0.1 to 0.75kW
Single-phase 0.1 to 0.4kW

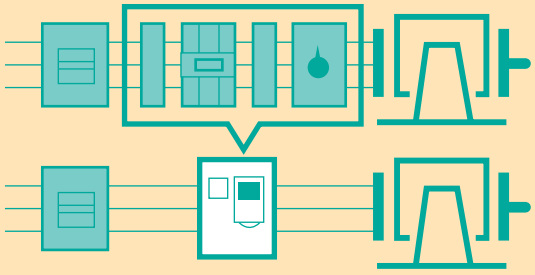


(Example of 200V, three-phase, 1.5kW model)
200V 3-phase 1.5 to 3.7kW
Single-phase 0.75 to 1.5kW

Perfect for these applications:

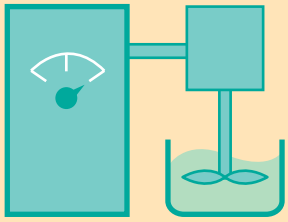
■ Replacing contactors

Provides maintenance-free operation by eliminating contacts.



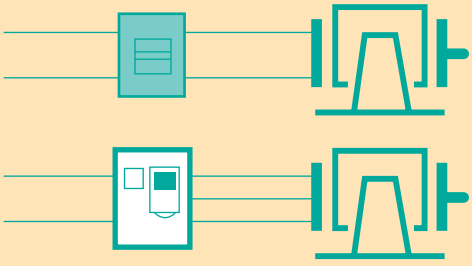
■ Food processing machinery

Multi-step speed operation (maximum of nine steps) can be set in advance to handle a wide range of processing operations and materials.



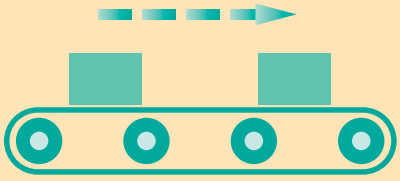
■ Replacing single-phase motors

Improve efficiency by replacing a single-phase motor with a 3-phase motor.



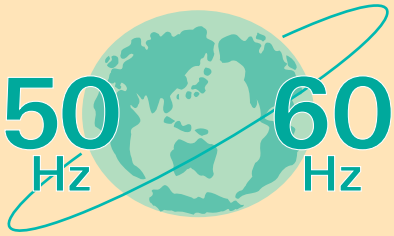
■ Conveyors

Prevent load from toppling with soft starts and stops, using the multi-step speed features (maximum of nine steps) to vary conveyor speed.



■ Machine standardization

By mounting an inverter, the same machine can be used regardless of the frequency of the power supply (50 or 60 Hz).



■Mass-flow machinery (pumps and fans)

Smooth variation in motor rotation speed means optimal flow rate control, delivering energy-saving operation.

Display and Keypad Description

Digital Operator

Function Display LEDs
Selected function is lit (See the functions below). Its data is displayed on data display.

Operation Key
Press to run the motor. The RUN light is ON while running.

Alarm LED

Run LED

Frequency Setting Volume
Set operational frequency with volume.

Data Display

Display Selection Key
Switch functions among function display LEDs.

Enter Key
Enter data when setting constants. After selecting constant No. at **PRGM** mode, data are displayed.

Increment Key
Increase constant No. or data.

Decrement Key
Decrease constant No. or data.

Stop/Reset Key
Press to stop the motor. If fault occurs, reset the inverter.

Function Display LED Description

FREF — Frequency reference setting/monitoring

FOUT — Output frequency monitoring

IOUT — Output current monitoring

MNTR — Multi-function monitoring

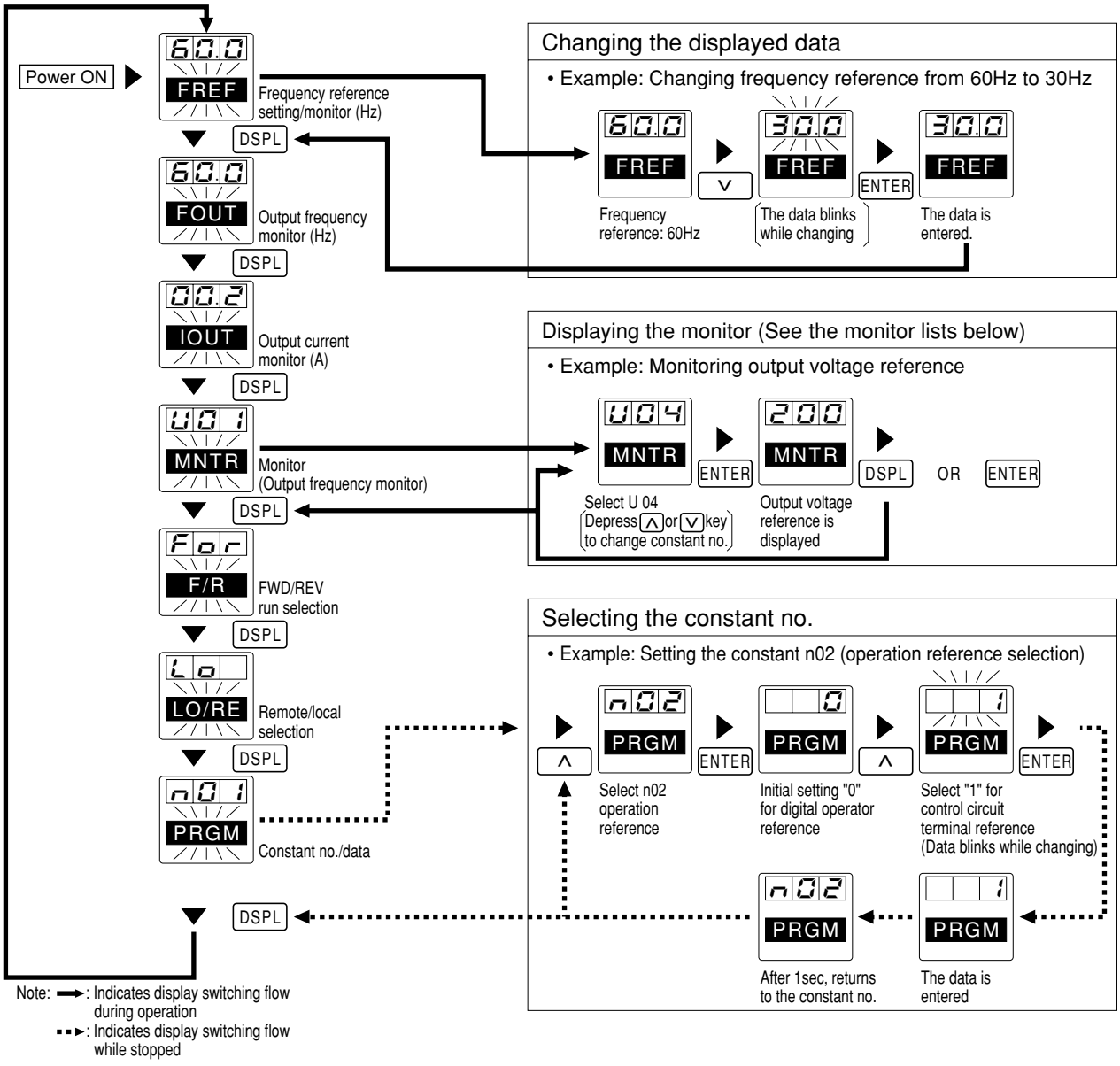
F/R — Operator RUN command FWD/REV selection

LO/RE — LOCAL/REMOTE selection

PRGM — Constant No./data

Switching the Function LEDs

Changing the Constant Data


Power ON
FREF
Frequency reference setting/monitor (Hz)
DSPL
FOUT
Output frequency monitor (Hz)
IOUT
Output current monitor (A)
MNTR
Monitor (Output frequency monitor)
F/R
FWD/REV run selection
LO/RE
Remote/local selection
PRGM
Constant no./data
Changing the displayed data
• Example: Changing frequency reference from 60Hz to 30Hz
Frequency reference: 60Hz
The data blinks while changing
The data is entered.
ENTER
Displaying the monitor (See the monitor lists below)
• Example: Monitoring output voltage reference
Select U 04
Depress ∧ or ∨ key to change constant no.
Output voltage reference is displayed
OR
Selecting the constant no.
• Example: Setting the constant n02 (operation reference selection)
Select n02 operation reference
Initial setting "0" for digital operator reference
Select "1" for control circuit terminal reference (Data blinks while changing)
After 1sec, returns to the constant no.
The data is entered
Note: → : Indicates display switching flow during operation
⇢ : Indicates display switching flow while stopped

Monitor (MNTR) Lists

Constant No.	Monitor	Unit
U 01	Frequency reference (FREF)*	Hz
U 02	Output frequency (FOUT)*	Hz
U 03	Output current (IOUT)*	A
U 04	Output voltage (1V unit) Example: 200V	V
U 05	DC voltage (1V unit) Example: 300V	V
U 06	Input terminal status	—
U 07	Output terminal status	—
U 09	Fault history (The last four faults are displayed.)	—
U 10	Software No. (Four digits of PROM are displayed.)	—

∗ The digital operator LED is not lit.

Fault display method

• Display format

□ □ □ : 3-digit, 7-segment LED

Fault description example: "Uv 1" is displayed at Uv1 fault.
"– – –" is displayed when there is no fault.

• Clearing fault history

Set the constant n01 to "6," then the n01 data returns to the previous value.
Or initialize the constant, then n01 returns to the default setting.

STANDARD SPECIFICATIONS

Voltage Class			200V single-/ three-phase							400V three-phase							
Model CIMR-J7A□□□□□		Three-phase	20P1	20P2	20P4	20P7	21P5	22P2	23P7	40P2	40P4	40P7	41P5	42P2	43P0	43P7	
		Single-phase*1	B0P1	B0P2	B0P4	B0P7	B1P5	—	—	—	—	—	—	—	—	—	
Max. Applicable Motor Output*2 kW (HP)			0.1 (0.13)	0.2 (0.25)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	0.37 (0.5)	0.55 (0.75)	1.1 (1.5)	1.5 (2)	2.2 (3)	3.0 (4)	3.7 (5)	
Output Characteristics	Inverter Capacity kVA		0.3	0.6	1.1	1.9	3.0	4.2	6.7	0.9	1.4	2.6	3.7	4.2	5.5	6.5	
	Rated Output Current A		0.8	1.6	3	5	8	11	17.5	1.2	1.8	3.4	4.8	5.5	7.2	8.6	
	Max. Output Voltage V		3-phase, 200 to 230V (proportional to input voltage) Single-phase, 200 to 240V (proportional to input voltage)							3-phase, 380 to 460V (proportional to input voltage)							
	Max. Output Frequency		400Hz (Programmable)														
Power Supply	Rated Input Voltage and Frequency		3-phase, 200 to 230V, 50/60Hz Single-phase, 200 to 240V, 50/60Hz							3-phase, 380 to 460V, 50/60Hz							
	Allowable Voltage Function		-15 to +10%														
	Allowable Frequency Function		±5%														
Control Characteristics	Control Method		Sine wave PWM (V/f control)														
	Frequency Control Range		0.1 to 400Hz														
	Frequency Accuracy (Temperature Change)		Digital reference: ±0.01% (-10 to +50°C), Analog reference: ±0.5% (25±10°C)														
	Frequency Setting Resolution		Digital reference: 0.01Hz (less than 100Hz), 0.1Hz (100Hz or more) Analog reference: 1/1000 of max. output frequency														
	Output Frequency Resolution		0.01Hz														
	Overload Capacity		150% rated output current for one minute														
	Frequency Reference Signal		0 to 10VDC (20kΩ), 4 to 20mA (250Ω), 0 to 20mA (250Ω) , frequency setting volume (selectable)														
	Accel/Decel Time		0.1 to 999 sec. (accel/decel time are independently programmed)														
	Braking Torque		Short-term average deceleration touque*3 : 0.1, 0.2kW (0.13HP, 0.25HP):150% or more; 0.4/0.75kW (0.5HP,1HP): 100% or more; 1.5kW (2HP): 50% or more; 2.2kW (3HP) or more: 20% or more Continuous regenerative torgue: Approx. 20%														
	V/f Characteristics		Possible to program any V/f pattern														
Protective Functions	Motor Overload Protection		Electronic thermal overload relay														
	Instantaneous Overcurrent		Motor coasts to a stop at approx. 250% of inverter rated current														
	Overload		Motor coasts to a stop after 1 minute at 150% of inverter rated output current														
	Overvoltage		Motor coasts to a stop if DC bus voltage exceed 410V							Motor coasts to a stop if DC bus voltage exceed 820V							
	Undervoltage		Stops when DC bus voltage is approx. 200V or less (approx. 160V or less for single-phase series)							Stops when DC bus voltage is approx. 400V or less							
	Momentary Power Loss		Following items are selectable: Not provided (stop if power loss is 15ms or longer), continuous operation if power loss is approx. 0.5s or shorter, continuous operation														
	Cooling Fin Overheat		Protected by thermister														
	Stall Prevention		Individual level stall prevention can be set during acceleration or constant running, provided/not provided setting available during deceleration														
	Cooling Fan Fault		Protected by electronic circuit (fan lock detection)														
	Ground Fault		Protected by electronic circuit (operation level is approx. 250% of rated output current)														
	Power Charge Indication		ON until the DC bus voltage becomes 50V or less. RUN lamp stays ON or digital operator LED stays ON. (Charge LED is provided for 400V)														
Other Functions	Input Signals	Multi-function Input	Four of the following input signals are selectable: Forward/reverse run (3-wire sequence), fault reset, external fault (NO/NC contact input), multi-step speed operation, Jog command, accel/decel time select, external baseblock (NO/NC contact input), speed search command, UP/DOWN command, accel/decel hold command, LOCAL/REMOTE selection, communication/control circuit terminal selection, emergency stop fault, emergency stop alarm, self test														
	Output Signals	Multi-function Output	Following output signals are selectable (NO/NC contact output): Fault, running, zero speed, speed agreed, frequency detection (output frequency ≤ or ≥ set value), during overtorque detection, minor error, during baseblock, operation mode, inverter run ready, during fault retry, during undervoltage detection, reverse running, during speed seach, data output through communication														
	Standard Functions		Full-range automatic torque boost, slip compensation, 9-step speed operation (max.), restart after momentary power loss, DC injection braking current at stop/start (50% of inverter rated current, 0.5 sec, or less), frequency reference bias/gain, fault retry, speed search, frequency upper/lower limit setting, overtorque detection, frequency jump, accel/decel time switch, accel/decel prohibited, S-curve accel/decel, frequency reference with built-in volume, constants copy (option), MEMOBUS communications (Option)														
	Display	Status Indicator LED	RUN and ALARM provided as standard LED's														
		Digital Operator	Available to monitor frequency reference, output frequency, output current														
	Terminals		Main circuit: screw terminals Control circuit: plug-in screw terminal														
	Wiring Distance between Inverter and Motor		100m (328ft) or less														
Enclosure			Open chassis (IP20)														
Cooling Method			Cooling fan is provided for 200V, 0.75kW (1HP)(3-/single-phase), 400V, 1.5kW (2HP)(3-phase), others are self-cooling														
Environmental Conditions	Humidity		90% RH or less (non-condensing)														
	Storage Temperature*4		-20 to +60°C (-4 to 140°F) (Temperature during shipping for short period)														
	Ambient Temperature		-10 to +50°C (-50 to 122°F) (non-freezing)														
	Elevation		1000m (3280ft) or less														
	Vibration		Up to 9.8m/S² (1G) at 10 to 20Hz Up to 2m/S² (0.2G) at 20 to 50Hz														

*1 Single-phase series inverter output is three-phase (for three-phase motors).
*2 Based on a standard 4-pole motor for max. applicable motor output. Select the inverter model whose rated current is larger than motor rated current.
*3 Shows deceleration torque for uncoupled motor decelerating from 60Hz with the shortest possible deceleration time.

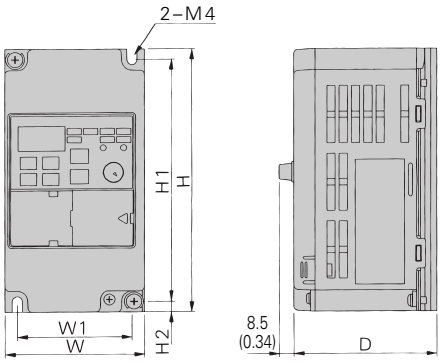


Figure 1

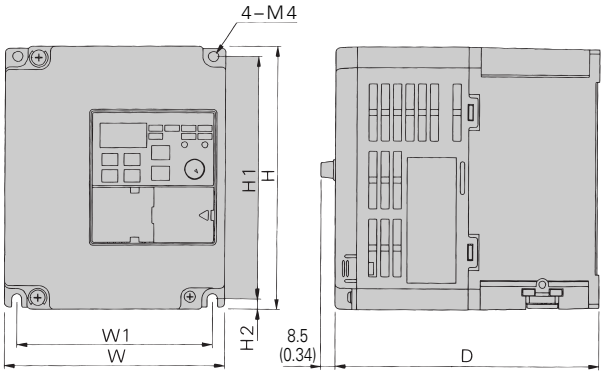


Figure 2

Voltage Class	Capacity kW (HP)	Fig. No.	Dimensions in mm (inches)						Mass kg (lb)	Heat Loss W		
			W	H	D	W1	H1	H2		Fin	Inside Unit	Total Heat Loss
200V Three-phase	0.1 (0.13)	1	68 (2.68)	128 (5.04)	70 (2.76)	56 (2.20)	118 (4.65)	5 (0.20)	0.5 (1.1)	3.7	9.3	13.0
	0.2 (0.25)									7.7	10.3	18.0
	0.4 (0.5)		68 (2.68)	128 (5.04)	102 (4.16)	56 (2.20)	118 (4.65)	5 (0.20)	0.8 (1.76)	15.8	12.3	28.1
	0.75 (1)				122 (4.80)				0.9 (1.98)	28.4	16.7	45.1
	1.5 (2)	2	108 (4.25)	128 (5.04)	129 (5.08)	96 (3.78)	118 (4.65)	5 (0.20)	1.3 (2.83)	53.7	19.1	72.8
	2.2 (3)				154 (6.06)				1.5 (3.31)	60.4	34.4	94.8
	3.7 (5)		140(5.51)	128(5.04)	161(6.34)	128(5.04)	118(4.65)	5 (0.20)	2.1(4.63)	96.7	52.4	149.1
200V Single-phase	0.1 (0.13)	1	68 (2.68)	128 (5.04)	70 (2.76)	56 (2.20)	118 (4.65)	5 (0.20)	0.5 (1.1)	3.7	10.4	14.1
	0.2 (0.25)									7.7	12.3	20.1
	0.4 (0.5)				112 (4.41)				0.9 (1.98)	15.8	16.1	31.9
	0.75 (1)	2	108 (4.25)	128 (5.04)	129 (5.08)	96 (3.78)	118 (4.65)	5 (0.20)	1.5 (3.31)	28.4	23.0	51.4
	1.5 (2)				154 (6.06)					53.7	29.1	82.8
400V Three-phase	0.37 (0.5)	2	108 (4.25)	128 (5.04)	81 (3.19)	96 (3.78)	118 (4.65)	5 (0.20)	1.0 (2.20)	9.4	13.7	23.1
	0.55 (0.75)				99 (3.90)				1.1 (2.43)	15.1	15.0	30.1
	1.1 (1.5)				129 (5.08)				1.5 (3.31)	30.3	24.6	54.9
	1.5 (2)				154 (6.06)					45.8	29.9	75.7
	2.2 (3)									50.5	32.5	83.0
	3.0 (4)		140 (5.51)	128 (5.04)	161 (6.34)	128 (5.04)	118 (4.65)	5 (0.20)	2.1 (4.63)	58.2	37.6	95.8
	3.7 (5)									73.4	44.5	117.9

■ Model Designation

C I M R — J 7 A A 2 0 P 1

Inverter

VS mini J7 series

No.	Type
A	With digital operator (with volume)
B	Without digital operator
C	With digital operator (without volume)

No.	Specifications
A	Japan domestic standards

Conformed to UL/cUL, CE marking.

No.	Applicable maximum motor output
0P1	0.1kW (0.13HP)
0P2	0.2kW (0.25HP)
0P4	0.4kW (0.5HP)
0P7	0.75kW (1HP)
1P5	1.5kW (2HP)
2P2	2.2kW (3HP)
3P0	3.0kW (4HP)
3P7	3.7kW (5HP)

No.	Voltage Class
B	Single-phase 200VAC
2	Three-phase 200VAC
4	Three-phase 400VAC

■ Capacity Code Designation

2 0 P 1 0

No.	Phase / Voltage
B	Single-phase 200VAC
2	Three-phase 200VAC
4	Three-phase 400VAC

No.	Applicable maximum motor output
0P1	0.1kW (0.13HP)
0P2	0.2kW (0.25HP)
0P4	0.4kW (0.5HP)
0P7	0.75kW (1HP)
1P5	1.5kW (2HP)
2P2	2.2kW (3HP)
3P0	3.0kW (4HP)
3P7	3.7kW (5HP)

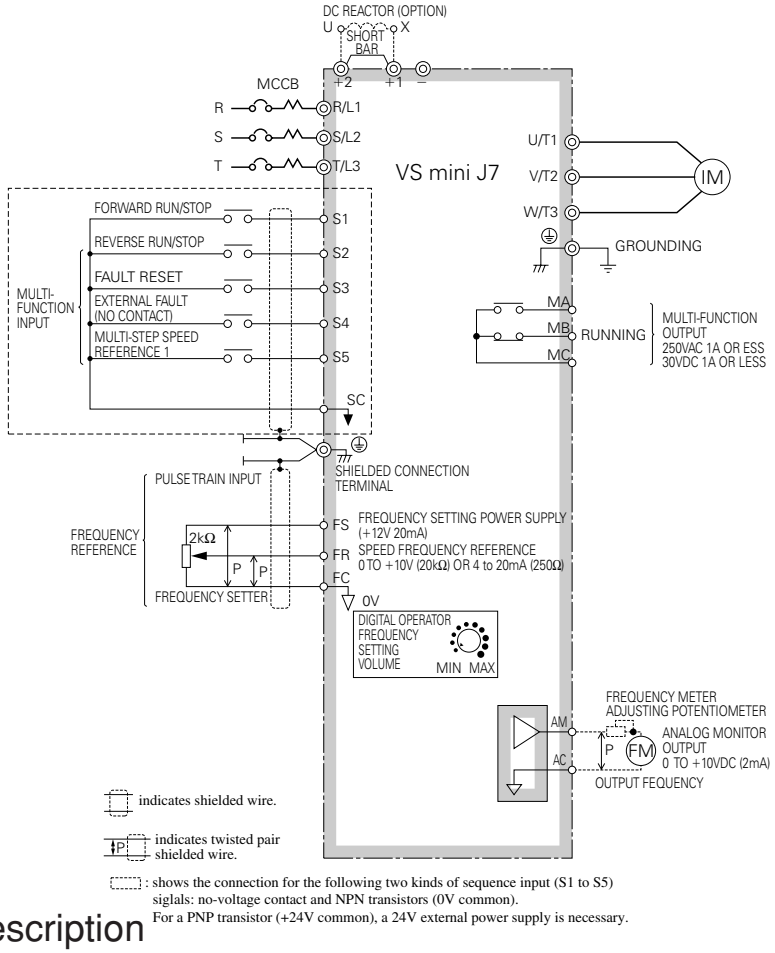
No.	Protective structure
0	Open chassis (IP20)

■ Models

Voltage class	Description		Model	Capacity code to be filled in model ☐☐☐ (Max. applicable motor output kW)							
				0P1 (0.1)	0P2 (0.2)	0P4 (0.4)	0P7 (0.7)	1P5 (1.5)	2P2 (2.2)	3P0 (3.0)	3P7 (3.7)
Single-phase 200V	With Digital Operator	With Analog Volume	CIMR-J7A☐B ☐☐☐	○	○	○	○	○	—	—	—
		Without Analog Volume	CIMR-J7C☐B ☐☐☐								
	Without Digital Operator		CIMR-J7B☐B ☐☐☐	○	○	○	○	○	—	—	—
Three-phase 200V	With Digital Operator	With Analog Volume	CIMR-J7A☐2 ☐☐☐	○	○	○	○	○	○	—	○
		Without Analog Volume	CIMR-J7C☐2 ☐☐☐								
	Without Digital Operator		CIMR-J7B☐2 ☐☐☐	○	○	○	○	○	○	—	○
Three-phase 400V	With Digital Operator	With Analog Volume	CIMR-J7A☐4 ☐☐☐	—	○	○	○	○	○	○	○
		Without Analog Volume	CIMR-J7C☐4 ☐☐☐								
	Without Digital Operator		CIMR-J7B☐4 ☐☐☐	—	○	○	○	○	○	○	○

Note: Models without cooling fin are available.
Contact your YASKAWA representative.

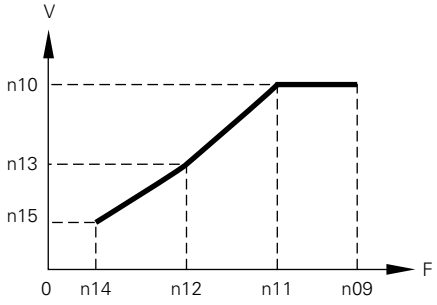
○: provided



■ Model Description

Type		Terminal		Name	Function (Signal Level)	
Main Circuit		R/L1, S/L2, T/L3		AC Power Supply Input	Main circuit power supply input (Use R/L1 and S/L2 for single-phase power supply inverter. Do not use T/L3 of the models less than 0.75kW for other usage, such as a junction terminal.)	
		U/T1, V/T2, W/T3		Inverter Output	For inverter output	
		+2, +1		DC Reactor Connection	Remove the short bar between +2 and +1 when connecting DC reactor (option)	
		+1, –		DC Power Supply Input	For power supply input (+1: positive electrode; – : negative electrode)*	
		⏚		Grounding	For grounding (Grounding should be conforming to the local grounding code.)	
Control Circuit	Input	Sequence	S1	Forward Run Input	Runs when CLOSED, stops when OPEN.	24VDC, 8mA photocoupler insulation
			S2	Multi-function Input Selection 2	Factory setting: Runs when CLOSED, stops when OPEN.	
			S3	Multi-function Input Selection 3	Factory setting: “Fault reset”	
			S4	Multi-function Input Selection 4	Factory setting: “External fault (NO contact)”	
			S5	Multi-function Input Selection 5	Factory setting: “Multi-step speed reference 1”	
			SC	Multi-function Input Selection Common	Common for control signal	
		Frequency Reference	FS	Power Supply Terminal for Frequency Setting	+12V (allowable current: 20mA max.)	
			FR	Speed Frequency Reference	0 to +10V DC (20kΩ) or 4 to 20mA (250Ω), 0 to 20mA (250Ω) (resolution 1/1000)	
			FC	Frequency Reference Common	0V	
	Output	Multi-function Contact Output	MA	NO Contact Output	Factory setting: “Running”	Contact capacity 250VAC, 1A or less 30VDC, 1A or less
			MB	NO Contact Output		
			MC	Contact Output Common		
		AM		Analog Monitor Output	Factory setting: “Output frequency” 0 to +10V output	0 to 10V 2mA or less Resolution: 8bits
		AC		Analog Monitor Common	0V	

*DC power supply input terminal is not conformed to CE and UL/cUL standards.

Function	Constant No. n□□	Function Name	Description	Setting Range	Min. Setting Unit	Initial	Ref. Page
Selecting Constant Group Initializing	01	Password	0 : n01 read and set, n02 to n79 read only (FREF of digital operator can be set) 1 : n01 to n79 read and set 6 : Fault history clear 8 : Initialization-reset (multi-function terminal to initial setting) 9 : 3-wire initialization-reset	0, 1, 6, 8, 9	1	1	17
Selecting Operation Mode	02	Run command selection	0 : Digital operator 1 : Control circuit terminal 2 : Communication	0 to 2	1	0	17
	03	Frequency reference selection	0 : Volume 1 : Frequency Reference 1 (n21) 2 : Control circuit terminal (0 to 10 V) 3 : Control circuit terminal (4 to 20 mA) 4 : Control circuit terminal (0 to 20 mA) 6 : Communication	0 to 4.6	1	0*1	
Selecting Stopping Method	04	Selecting Stopping Method	0 : Deceleration to stop 1 : Coast to a stop	0, 1	1	0	23
Reverse Run Prohibited	05	Selecting reverse run prohibited	0 : reverse run enabled 1 : reverse run disabled	0, 1	1	0	17
Selecting Digital Operator Key Function	06	Stop key function	0 : Stop key is always effective 1 : Stop key is effective when operated from digital operator	0 , 1	1	0	23
	07	Selecting frequency reference in local mode	0 : Volume 1 : Frequency reference 1 (n21)	0, 1	1	0*1	–
	08	Frequency reference setting method from digital operator	0 : Enter key used 1 : Enter key not used	0, 1		0	–
Setting V/f Pattern	09	Max. output frequency	 When V/f pattern is a straight line, set n12 and n14 to the same value. In this case, n13 is disregarded.	50.0 to 400Hz	0.1Hz (less than 100Hz) 1Hz (100Hz or more)	60.0Hz	16 25
	10	Max. voltage		0.1 to 255V*2	1V	200V*2	
	11	Max. voltage output frequency (base frequency)		0.2 to 400Hz	0.1Hz (less than 100Hz) 1Hz (100Hz or more)	60.0Hz	
	12	Mid. output frequency		0.1 to 399Hz		1.5Hz	25
	13	Mid. output frequency voltage		0.1 to 255V*2	1V	12V*2	
	14	Min. output frequency		0.1 to 10Hz	0.1Hz	1.5Hz	
	15	Min. output frequency voltage		0.1 to 50V*2	1V	12V*2	

*1 The factory setting of inverters with operator without volume (JVOP-146) is "1". When initialized, turn to "0".
*2 For 400V class inverter, the upper limit of voltage setting range and the setting value before shipment are twice that of (=400/200) 200V class.

Function	Constant No. n□□	Function Name	Description	Setting Range	Min. Setting Unit	Initial	Ref. Page
Selecting Acceleration/ Deceleration Time	16*	Acceleration time 1	Sets acceleration time in the unit when frequency reference changes from 0 to 100 %.	0.0 to 999	0.1s (less than 100s) 1s (100s or more)	10.0s	16 19
	17*	Deceleration time 1	Sets deceleration time in the unit when frequency reference changes from 100 to 0 %.	0.0 to 999		10.0s	
	18*	Acceleration time 2	Effective when acceleration time 2 is selected at multi-function contact input selection. Setting is the same as n16.	0.0 to 999		10.0s	
	19*	Deceleration time 2	Effective when deceleration time 2 is selected at multi-function contact input selection. Setting is the same as n17.	0.0 to 999		10.0s	
Selecting S-curve	20*	S-curve selection	0 : S-curve not provided 1 : 0.2 s 2 : 0.5 s 3 : 1.0 s	0 to 3	1	0	20
Frequency Reference (FREF)	21*	Frequency reference 1 (Master speed frequency reference)	Sets master speed frequency reference. Setting is the same as simple operation lamp FREF).	0.0 to 400Hz	0.1 Hz (less than 100Hz) 1 Hz (100 Hz or more)	6.0Hz	18
	22*	Frequency reference 2	Sets second frequency reference. It is effective when multi-step speed reference 1 is selected in multi-function contact input.			0.0Hz	
	23*	Frequency reference 3	Sets third frequency reference. It is effective when multi-step speed reference 2 is selected in multi-function contact input.				
	24*	Frequency reference 4	Sets fourth frequency reference. It is effective when multi-step speed references 1 and 2 are selected in multi-function contact input.				
	25*	Frequency reference 5	Sets fifth frequency reference. It is effective when multi-step speed reference 3 is selected in multi-function contact input.				
	26*	Frequency reference 6	Sets sixth frequency reference. It is effective when multi-step speed references 1 and 3 are selected in multi-function contact input.				
	27*	Frequency reference 7	Sets seventh frequency reference. It is effective when multi-step speed references 2 and 3 are selected in multi-function contact input.				
	28*	Frequency reference 8	Sets eighth frequency reference. It is effective when multi-step speed references 1, 2, and 3 are selected in multi-function contact input.				
	29*	Jog frequency	Sets jog frequency. It is effective when jog frequency is selected in multi-function contact input.			6.0Hz	18 19
Frequency Reference Limit	30	Frequency reference upper limit	Sets upper limit of frequency reference in units of 1 %. Max. output frequency (n09) is 100 %.	0 to 110%	1%	100%	19
	31	Frequency reference lower limit	Sets lower limit of frequency reference in units of 1 %. Max. output frequency (n09) is 100 %.	0 to 110%	1%	0%	
Motor Protection by Electronic Thermal	32	Motor rated current	Sets motor rated current of the motor nameplate. It is the standard current for motor electro-thermal protection.	0 to 120 % of inverter rated output current	0.1A	Different according to inverter capacity (kVA)	17 27
	33	Electronic thermal motor protection selection	0 : Standard motor 1 : Inverter motor 2 : No protection	0 to 2	1	0	27
	34	Electronic thermal motor protection time constant setting	Sets constant for motor protection. For standard and inverter motors (standard rating), 8min., for others (short period rating), 5min.	1 to 60min	1min	8min	
Selecting Cooling Fan Operation	35	Selecting cooling fan operation	0 : ON/OFF control (ON while running, OFF when stopped. ON for one minute after stopping.) 1 : Operates with power supply ON	0.1	1	0	–

* Can be changed during operation.

Function	Constant No. n□□	Function Name	Description	Setting Range	Min. Setting Unit	Initial	Ref. Page
Selecting Sequence Input Functions	36	Multi-function input selection 2 (Terminal S2)	2 : REV run command (2-wire sequence) 3 : External fault (NO contact input) 4 : External fault (NC contact input) 5 : Fault reset 6 : Multi-step speed reference 1 7 : Multi-step speed reference 2 8 : Multi-step speed reference 3 10 : Jog reference 11 : Accel/Decel time selection 12 : External baseblock (NO contact input) 13 : External baseblock (NC contact input) 14 : Search command from maximum. output frequency 15 : Search command from set frequency 16 : Accel/Decel prohibit 17 : Local/Remote selection 18 : Comm./Control circuit terminal selection 19 : Emergency stop fault (NO contact input) 20 : Emergency stop alarm (NO contact input) 21 : Emergency stop fault (NC contact input) 22 : Emergency stop alarm (NC contact input)	2 to 8 10 to 22	1	2	18 19 21 22 23
	37	Multi-function input selection 3 (Terminal S3)	0 : FWD/REV run command (3-wire sequence) Other set items are same as n36	0.2 to 8, 10 to 22	1	5	
	38	Multi-function input selection 4 (Terminal S4)	Set items are same as n36	2 to 8 10 to 22	1	3	
	39	Multi-function input selection 5 (Terminal S5)	Set items are same as n36. 34 : UP/DOWN command (Terminal S4 is UP command/DOWN command and the setting of n38 is invalid) 35 : Loop test (MEMOBUS)	2 to 8 10 to 22 34, 35	1	6	
Selecting Sequence Output Functions	40	Multi-function output selection 1 (Contact output terminal MA-MB-MC)	0 : Fault 1 : Running 2 : Speed agreed 3 : Zero speed 4 : Frequency detection 1 (Output frequency ≧ Custom frequency detection) 5 : Frequency detection 2 (Output frequency ≦ Custom frequency detection) 6 : Overtorque detection (NO contact output) 7 : Overtorque detection (NC contact output) 10 : Minor fault (alarm displays) 11 : During baselock 12 : Operation mode 13 : Inverter operation ready 14 : During fault retry 15 : Low voltage detecting 16 : In REV running 17 : Speed searching 18 : Output from communication	0 to 7 10 to 18	1	1	25
Selecting Frequency Reference Functions	41*	Analog frequency reference gain	Sets internal reference level in units of 1 % when frequency reference voltage (current) is 10V (20mA). Max. output frequency (n09) is 100 %.	0 to 225%	1%	100%	19
	42*	Analog frequency reference bias	Sets internal reference level in units of 1 % when frequency reference voltage (current) is 0V (4mA or 0mA). Max. output frequency (n09) is 100 %.	–99 to 99%	1%	0%	19
	43	Filter time constant for analog frequency reference constant	Sets filter time constant for analog input primary lag. (to avoid noise)	0.00 to 2.00s	0.01s	0.10s	–
Selecting Analog Monitor Functions	44	Multi-function analog output (terminal AM-AC)	0 : Output frequency (10V/Max. frequency n09) 1 : Output current (10V/Inverter rated current)	0, 1	–	0	22
	45*	Analog monitor gain	Adjusts output voltage level of analog monitor. (ex.) when 3V is 100 % level, sets as n45 = 0.30	0.00 to 2.00	0.01	1.00	22

* Can be changed during operation.

Function	Constant No. n□□□	Function Name	Description	Setting Range	Min. Setting Unit	Initial	Ref. Page
Adjusting Carrier Frequency	46	Carrier frequency selection	Carrier frequency 1, 2, 3, 4 : Set value ×2.5 Hz 7, 8, 9 : Proportional to output frequency of 2.5 kHz max. (lower limit 1 kHz)	1 to 4 7 to 9	1	4 (Different according to inverter capacity (kVA))	22
Momentary Power Loss Ridethrough	47	Momentary power loss ridethrough method	0 : Not provided 1 : Continuous operation after power recovery within the power loss ridethrough time. 2 : Continuous operation after power recovery (no fault output of UV1)	0 to 2	1	0	20
Fault Retry	48	Automatic retry attempts	Sets automatic retry times after self-diagnosis when an inverter fault occurs.	0 to 10	1	0	20
Jump Frequency Control	49	Jump frequency 1	Sets frequency to jump. Disabled when setting value is 0.0.	0.0 to 400Hz	0.1 Hz (less than 100 Hz) 1 Hz (100 Hz or more)	0.0Hz	21
	50	Jump frequency 2					
	51	Jump frequency range	Sets the frequency range to jump. Disabled when setting value is 0.00.	0.0 to 25.5Hz	0.01Hz		
DC Injection Braking	52	DC injection braking current	Sets current value at DC injection braking. Inverter rated current is 100 %.	0 to 100%	1%	50%	21 23
	53	DC injection braking time at stop	Sets DC injection braking time at ramp to stop in units of 0.1 sec. Disabled at stop when the setting value is 0.0.	0.0 to 25.5s	0.1s	0.5s	23
	54	DC injection braking time at start	Sets DC injection braking time at start in units of 0.1 sec. Disabled at start when the setting value is 0.0.	0.0 to 25.5s	0.1s	0.0s	21
Stall Prevention	55	Stall prevention during deceleration	0 : Enabled 1 : Disabled	0, 1	1	0	26
	56	Stall prevention level during acceleration	Sets stall prevention level in units of 1 % during acceleration. Inverter rated current is 100 % (Notes: ・Disabled with setting of 200 %. ・In constant output area, prevention level is automatically lowered.)	30 to 200%	1%	170%	
	57	Stall prevention level during running	Sets stall prevention level in units of 1 % during running. Inverter rated current is 100 %. (Note：Disabled with setting of 200 %)	30 to 200%	1%	160%	
Frequency Detection	58	Frequency detection (multi-function contact output)	Sets frequency to detect when selected frequency detection at multi-function contact output .	0.0 to 400Hz	0.1 Hz (less than 100 Hz) 1 Hz (100 Hz or more)	0.0Hz	21
Detecting Overtorque	59	Overtorque detecting function selection	0 : Detection disabled 1 : Detected during constant-speed running, and operation continues during and after detection. 2 : Detected during constant-speed running, and inverter output is shut OFF after detection. 3 : Detected during running, and operation continues during and after detection. 4 : Detected during running, and inverter output is shut OFF after detection.	0 to 4	1	0	20
Detecting Overtorque	60	Overtorque detection level	Sets overtorque detection level when detecting at multi-function contact output and multi-function photocoupler output. • Inverter rated current is 100% when detecting by current. • Motor rated torque is 100% when detecting by torque.	30 to 200%	1%	160%	20
	61	Overtorque detection time	Sets overtorque detection time. Overtorque is detected when the set time or the overtorque detection level setting is exceeded.	0.1 to 10.0s	0.1s	0.1s	

Function	Constant No. n□□	Function Name	Description	Setting Range	Min. Setting Unit	Initial	Ref. Page
Holding Output Frequency	62	Hold output frequecy saving selection	Selects whether or not to save the frequency when holding at UP/DOWN command from multi-function input terminal. 0 : Output frequency is not saved while holding 1 : When holding more than 5 sec, saves output frequency at holding and operates at this frequency when restarted.	0, 1	1	0	–
Torque Compensation	63*1	Torque compensation gain	Sets torque compensation gain in units of 0.1. Normally, no adjustment necessary.	0.0 to 2.5	0.1	1.0	25
Slip Compensation Function	64*1	Motor rated slip	Sets motor rated slip in units of 0.1 Hz.	0.0 to 20.0Hz	0.1Hz	(Different according to inverter capacity (kVA))	–
	65	Motor no-load current	Sets motor no-load current proportional to the motor rated current.	0 to 99%	1%	(Different according to inverter capacity (kVA))	27
	66*1	Slip compensation gain	For motor slipping calculated from the output current, sets gain to correct output frequency in units of 0.1.	0.0 to 2.5	0.1	0.0	27
	67	Slip compensation time constant	Adjusts for unstable speed and slow speed response.	0.0 to 25.5s	0.1s	2.0s	–
MEMOBUS Communication (when option unit is provided)	68	MEMOBUS time over detection	0 : Time over detection is enabled. (Coast to a stop) 1 : Time over detection is enabled. (Ramp to stop-Decel. 1) 2 : Time over detection is enabled. (Ramp to stop-Decel. 2) 3 : Time over detection is enabled. (Continue operation - alarm) 4 : Time over detection is disabled.	0 to 4	1	0	–
	69	MEMOBUS frequency reference and frequency monitor unit	0 : 0.1 Hz 1 : 0.01 Hz 2 : 30000/100% (30000=MAX. output frequency) 3 : 0.1 %	0 to 3	1	0	–
	70	MEMOBUS slave address	Allocates inverter MEMOBUS communication slave address between 0 to 32. Note: When set "0," ignores command from master and does not respond.	0 to 32	1	0	–
	71	MEMOBUS BPS selection	0 : 2400 bps 1 : 4800 bps 2 : 9600 bps 3 : 19200 bps	0 to 3	1	2	–
	72	MEMOBUS parity selection	0 : Even parity 1 : Odd parity 2 : No parity	0 to 2	1	0	–
	73	Transmission waiting time		0 to 65ms	1ms	10ms	–
	74	RTS Control	0 : Enabled 1 : Disabled (RS-422: at 1 to 1 communication)	0, 1	1	0	–
Carrier Frequency Selection*2	75	Reducing carrier frequency selection at low speed	0 : Invalid 1 : Valid	0, 1	1	0	–
Control Copy Function*2	76	Constant copy function selection	rdy : READY vFy : VERIFY rEd : READ vA : Inverter capacity display Cpy : COPY Sno : software No. display	rdy, rEd cPy, uFu vA, Sno	–	rdy	–
	77	Constant Read selection prohibit	0 : READ prohibited 1 : READ allowed	0.1	1	0	–
Fault History	78	Fault history	Displays newest one fault (only for monitoring)	–	–	–	–
Software Version	79	Software Version No.	Displays lowest 3 digits of software No. (only for monitoring)	–	–	–	–

*1 Can be changed during operation.
*2 Not built in for the software virsion VSP020010.

The set value displayed in ☐ is factory setting.

Programming features of VS mini J7 are explained according to the following items.

Item	Setting Function	Ref. Page
Items Should be Verified Before Operation	• Accel/decel time setting	16
	• V/f pattern setting	16
	• Motor rotation direction setting	17
	• LOCAL (operator) /REMOTE (control circuit terminal) selection	17
	• Motor rated current setting	17
	• Operation mode selection	17
	• Constant set-up	17
Setting Operating Condition	• Reverse run prohibit	18
	• Multi-step speed selection	18
	• Adjusting frequency setting signal	19
	• Operation at low speed	19
	• Adjusting frequency upper and lower limits	19
	• Using two accel/decel times	19
	• Automatic restart after momentary power loss	20
	• Soft-start characteristics	20
	• Torque detection	20
	• Continuing operation by automatic fault reset	20
	• Frequency detection	21
	• Avoiding resonance	21
	• Operating coasting motor without trip	21
	• Holding accel/decel temporarily	22
	• Using frequency meter or ammeter	22
	• Reducing motor noise or leakage current	22
Selecting Stopping Method	• Operator stop key selection	23
	• Selecting stopping method	23
	• Applying DC injection braking	23
Building Interface Circuits with External Devices	• Using input signals	23
	• Using output signals	25
Adjusting Motor Torque	• Adjusting torque according to application	25
	• Preventing motor from stalling (current limit)	26
Decreasing Motor Speed Fluctuation	• Slip compensation	27
Protecting Motor	• Motor overload detection	27

Items Should be Verified Before Operation

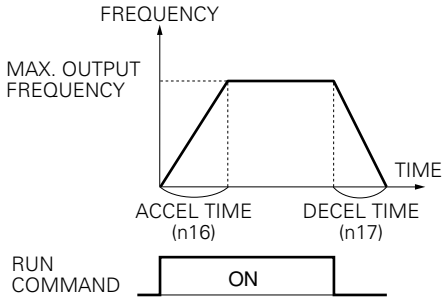
Accel/decel time setting

Accel time 1, 2 n16 n18

Decel time 1, 2 n17 n19

Accel time : Sets the time needed for the motor to accelerate to the maximum output frequency from the stopped status.

Decel time : Sets the time needed for the motor to stop from the maximum output frequency.



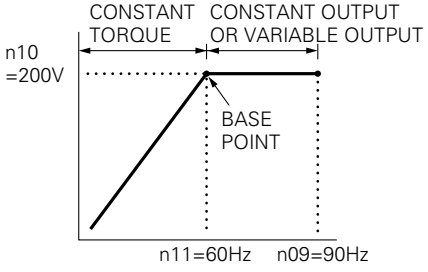
V/f pattern setting

Max. output frequency n09

Max. voltage n10

Max. voltage output frequency n11

Sets the V/f pattern which matches the motor characteristics. When operating at 50/60Hz or more frequency, change only the max. output frequency (n09) as follows.



Motor rotation direction setting

FWD/REV direction selection F/R

Sets the motor rotation direction when run command is given by the digital operator.
FWD and REV run can be switched by pressing ∧ or ∨ key.

FWD (FWD RUN) ⇄ REV (REV RUN)

LOCAL (operator)/REMOTE (control circuit terminal) selection

LOCAL/REMOTE switching LO/RE

Operation can be switched from digital operator or control circuit terminal. This function is valid only when stopped.
e.g. : Digital operator/control circuit terminal selection:
Operation mode selection n02=1
Frequency reference selection n03=2, 3 or 4
Local (LO) : Receives frequency reference (set at n07) and run command from digital operator
Remote (RE) : Receives frequency reference (FR) and run command (terminals S1 and S2) of circuit control terminal

* When local/remote selection function is allocated to multi-function input terminal, switching operation using ∧ and ∨ keys is invalid.

Motor rated current setting

Motor rated current n32

Sets motor rated current. The following table shows the standard set value for each inverter capacity. When the applicable motor rated current value differs from the value listed below, change the set value.

VS mini J7 model CIMR-J7□□□	20P1 B0P1	20P2 B0P2	20P4 B0P4	20P7 B0P7	21P5 B1P5	22P2	23P7
Max. Applicable Motor Output kw(HP)	0.1 (0.13)	0.2 (0.25)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)
Motor Current Factory Setting A	0.6	1.1	1.9	3.3	6.2	8.5	14.1

VS mini J7 model CIMR-J7□□□	40P2	40P4	40P7	41P5	42P2	43P0	43P7
Max. Applicable Motor Output kw(HP)	0.37 (0.5)	0.55 (0.75)	1.1 (1.5)	1.5 (2)	2.2 (3)	3 (4)	3.7 (5)
Motor Current Factory Setting A	0.6	1.0	1.6	3.1	4.2	7.0	7.0

Operation mode selection

Run command selection n02

Frequency reference selection n03

Selects whether operation is performed by digital operator or control circuit terminal.

Setting	Run Command n02
0	Operator
1	Control circuit terminal S1, S2
2	Communication

Setting	Frequency Reference n03
0	Volume
1	Operator (Frequency reference 1) n21
2	Control circuit terminal FR (0 to 10V)
3	Control circuit terminal FR (4 to 20mA)
4	Control circuit terminal FR (0 to 20mA)
6	Communication (register No., 0002H)

Notes : When set to 2 or 3 (current input reference), dip switch setting must be changed. For details, refer to the instruction manual.

Constant set-up

Password n01

The following table describes the data which can be set or read when n01 is set.

Setting	Constant
0 (Constant write disable)	Only n01 can be set, n01 to n79 can be read
1	n01 to n79 read/set
6	Fault history clear
8*	Constant initialization (factory setting: 2-wire sequence)
9*	Constant initialization (3-wire sequence)

* Initialization resets the value to factory setting.

The set value displayed in ☐ is factory setting.

Setting Operating Condition

Reverse run prohibit

Reverse run prohibit n05

"Reverse run disabled" setting does not accept a reverse run command from the control circuit terminal or digital operator. This setting is used for applications where a reverse run command can cause problems.

Setting	Description
0	Reverse run enabled.
1	Reverse run disabled.

Multi-step speed selection

Frequency reference FREF n21 to n29

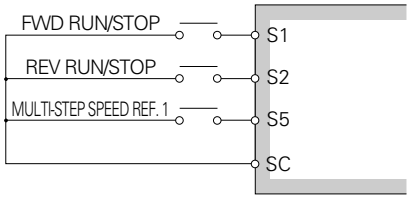
Multi-function input terminal function selection n36 to n39

By combining frequency reference and input terminal function selections, up to 9-step speed can be set.

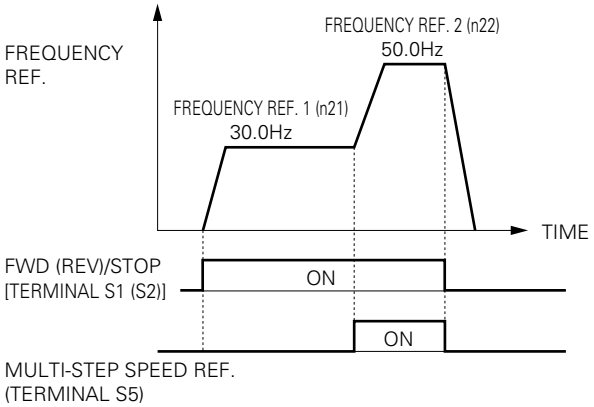
2-step speed change example

n02 = 1 (Operation mode selection)
n03 = 1 (Frequency reference selection)

n21 = 30.0Hz
n22 = 50.0Hz



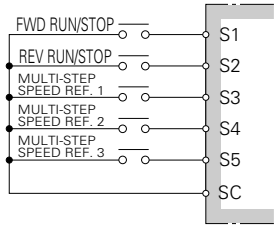
Note : When n03 is set to 0, 2 ,3, or 4, frequency reference 1 (n21) is disabled and frequency reference from volume (0) or control circuit terminal (FR) is enabled.



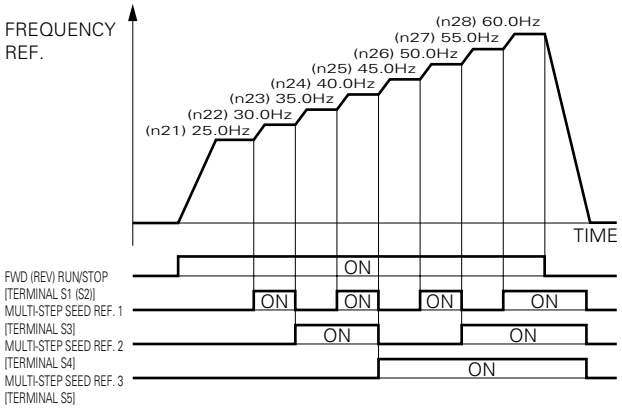
8-step speed change example

n02 = 1 (Operation mode selection)
n03 = 1 (Frequency reference selection)

n21 = 25.0 Hz
n22 = 30.0 Hz
n23 = 35.0 Hz
n24 = 40.0 Hz
n25 = 45.0 Hz
n26 = 50.0 Hz
n27 = 55.0 Hz
n28 = 60.0 Hz



n37 = 6 (Multi-function input terminal S3)
n38 = 7 (Multi-function input terminal S4)
n39 = 8 (Multi-function input terminal S5)



Adjusting frequency setting signal

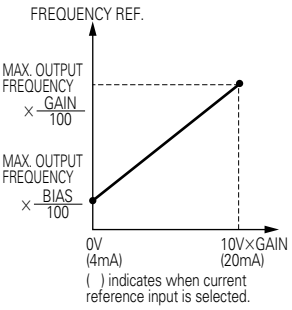
Frequency reference gain n41

Frequency reference bias n42

When the frequency reference is output by analog input of control circuit terminals FR and FC, the relation between analog voltage and frequency reference can be set.

Frequency reference gain (n41)
The analog input voltage value for the maximum output frequency (n09) can be set in units of 1%.
Factory setting : 100%

Frequency reference bias (n42)
The frequency reference provided when analog input is 0V (4mA or 0mA) can be set in units of 1%.
[n09 : Maximum output frequency = 100%]
Factory setting : 0%

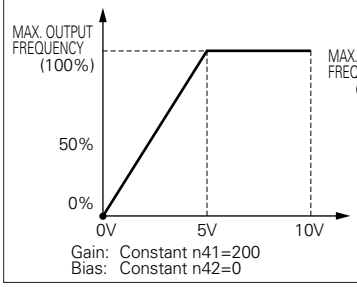

FREQUENCY REF.
MAX. OUTPUT FREQUENCY × GAIN / 100
MAX. OUTPUT FREQUENCY × BIAS / 100
0V (4mA)
10V×GAIN (20mA)
( ) indicates when current reference input is selected.

Gain : Outputs A % (ratio to max. output frequency n09) at 10V.
➡ n41 = A %

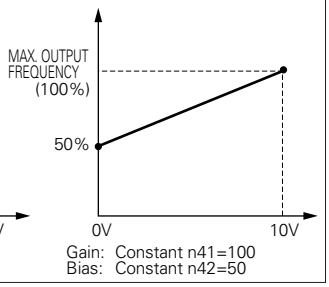
Bias : Outputs B % (ratio to max. output frequency n09) at 0V.
➡ n42 = B %

Typical Settings

• At 0 to 5V input



• To operate the inverter with frequency reference of 50% to 100% at 0 to 10V input



Operating at low speed

Jog frequency reference FREF n29

Jog command selection n36 to n39

By inputting a jog command and then a forward (reverse) run command, operation is enabled at the jog frequency set in n29. When multi-step speed references 1, 2, or 3 are input simultaneously with the jog command, the jog command has priority.

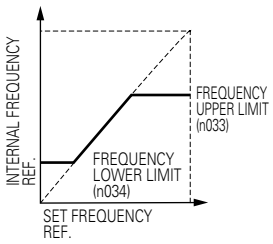
Name	Constant no.	Setting
Jog frequency reference	n29	Factory setting : 6.0Hz
Jog command	n36 to n39	Set to "10" for any constant.

Adjusting frequency upper and lower limits

Frequency reference upper limit n30

Frequency reference lower limit n31

Frequency reference upper limit (n30)
Sets the upper limit of the frequency reference in units of 1%.
[n09 : Maximum output frequency = 100%]
Factory setting : 100%



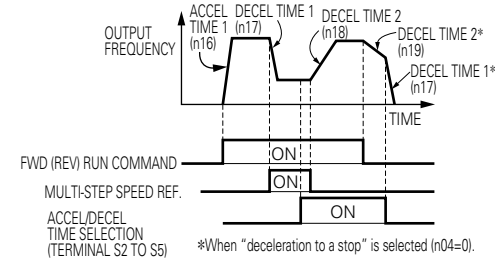
Frequency reference lower limit (n31)
Sets the lower limit of the frequency reference in units of 1%.
[n09 : Maximum output frequency = 100%]
When operating at frequency reference 0, operation continues at the frequency reference lower limit.
However, when frequency reference lower limit is set to less than the minimum output frequency (n14), operation is disabled.
Factory setting : 0%

Using two accel/decel times

Accel time 1, 2 n16 n18

Decel time 1, 2 n17 n19

Input terminal function selection n36 to n39



By setting input terminal function selection (one of n36 to n39) to "11" (accel/decel time select), accel/decel time is selected by turning ON/OFF the accel/decel time select (one terminal of S2 to S5).

At OFF : n16 (accel time 1)
n17 (decel time 1)
At ON : n18 (accel time 2)
n19 (decel time 2)

No.	Name	Unit*	Setting range	Initial setting
n16	Accel time 1	0.1s	0.0 to 999s	10.0s
n17	Decel time 1	0.1s	0.0 to 999s	10.0s
n18	Accel time 2	0.1s	0.0 to 999s	10.0s
n19	Decel time 2	0.1s	0.0 to 999s	10.0s

* Setting unit is 1s when 100s or more.

• Accel time
Set the time needed for output frequency to reach 100% from 0%.

• Decel time
Set the time needed for output frequency to reach 0% from 100%.

The set value displayed in ☐ is factory setting.

Automatic restart after momentary power loss

Operation selection after momentary power loss n47

When momentary power loss occurs, operation restarts automatically.

Setting	Description
0	Continuous operation after momentary power loss not provided.
1*	Continuous operation after power recovery within 0.5 second.
2*†	Continuous operation after power recovery (Fault output not provided).

* Hold the operation command to continue the operation after recovery from a momentary power loss.

† When 2 is selected, operation restarts if power supply voltage reaches its normal level. No fault signal is output.

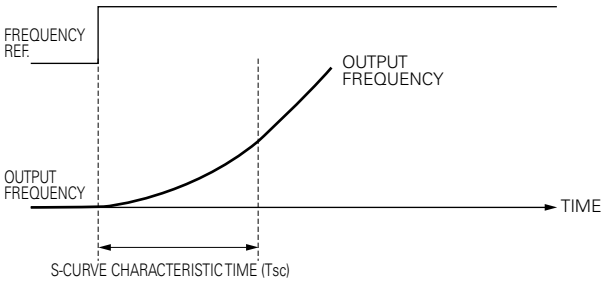
Soft-start characteristics

S-curve accel/decel time selection n20

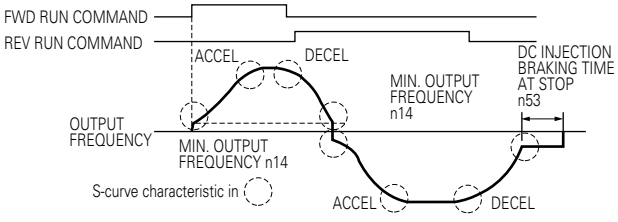
To prevent shock at machine start/stop, accel/decel can be performed in S-curve pattern.

Setting	S-curve characteristic time
0	S-curve characteristic not provided
1	0.2 second
2	0.5 second
3	1.0 second

Note : S-curve characteristic time is the time from accel/decel rate 0 to a regular accel/decel determined by the set accel/decel time.



Time chart at FWD/REV run switching at deceleration to a stop



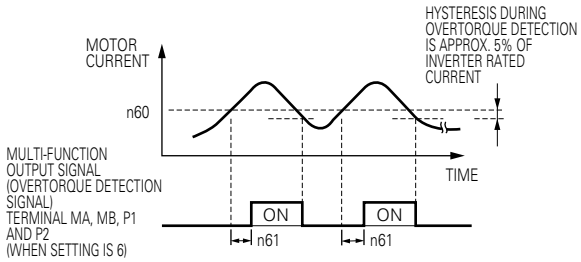
Torque detection

Overtorque detection function selection n59

Overtorque detection level n60

Overtorque detection time n61

If excessive load is applied to the machine, output current increase can be detected by output alarm signals at multi-function output terminals MA, MB and MC.
To output overtorque detection signal, set multi-function output terminal selection n40 to "overtorque detection (set 6 or 7)".



Overtorque detection function selection 1 (n59)

Setting	Description
0	Overtorque detection not provided.
1	Detected only during constant-speed running, and operation continues after detection.
2	Detected only during constant-speed running, and operation stops after detection.
3	Detected during running, and operation continues after detection.
4	Detected during running, and operation stops after detection.

Continuing operation by automatic fault reset

No. of fault retry times n48

Sets the inverter to restart and reset fault detection [overcurrent (OC) or overvoltage (OV)] after a fault occurs.
The number of self-diagnosis and retry attempts can be set at n48 up to 10 times.
The number of retry attempts are cleared to 0 in the following cases :

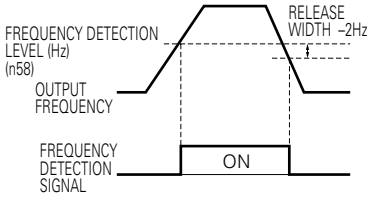
- If no other fault occurs within 10 minutes after retry
- When the fault reset signal is ON after the fault is detected
- Power supply is turned OFF

Frequency detection

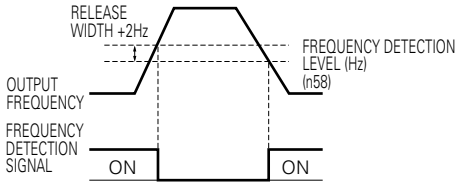
Frequency detection level n58

Effective when output terminal function selections n40, are set to "frequency detection (setting : 4 or 5). "Frequency detection" turns ON when output frequency is higher or lower than the frequency detection level (n58).

Frequency detection 1 (Output frequency ≧ Frequency detection level)
(Set n40 to "4")



Frequency detection 2 (Output frequency ≦ Frequency detection level)
(Set n40 to "5")



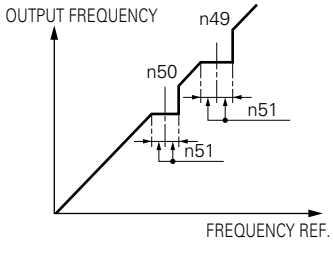
Avoiding resonance

Jump frequency 1, 2 n49 n50

Jump width n51

This function allows the prohibition or "jumping" of critical frequencies so that the motor can operate without resonance caused by machine systems. This function is also used for dead band control. Setting the value to 0.0Hz disables this function.

Set jump frequency 1, 2 or 3 as follows:



n49 ≧ n50

If this condition is not satisfied the inverter displays Err for one second and restores the data to original settings.

Note : Gradually changes without jumping during accel/decel.

Operating coasting motor without trip

Speed search command

Input terminal function selection n36 to n39

DC injection braking at start

DC injection braking current n52

DC injection braking time at start n54

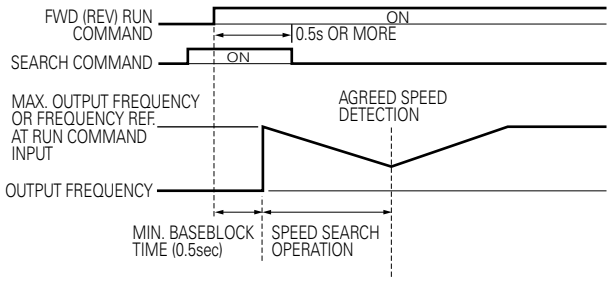
To operate coasting motor without trip, use the speed search command or DC injection braking at start.

Speed search command

Restarts a coasting motor without stopping it. This function enables smooth switching between motor commercial power supply operation and inverter operation.

Set input terminal function selection (n36 to n39) to "14" (search command from maximum output frequency) or "15" (search command from set frequency).

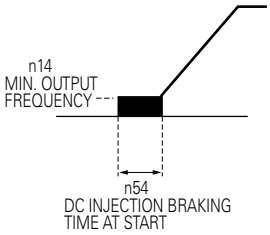
Build a sequence so that FWD (REV) run command is input at the same time as the search command or after the search command. If the run command is input before the search command, the search command becomes disabled.



Time chart at search command input

DC injection braking at start (n52, n54)

Restarts a coasting motor after stopping it. Set DC injection braking time at start in n54 in units of 0.1 second. Set DC injection braking current in n52 in units of 1%. When the setting of n54 is "0," DC injection braking is not performed and acceleration starts from the minimum output frequency.



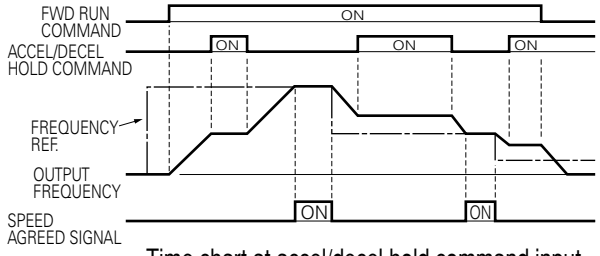
The set value displayed in ☐ is factory setting.

Holding accel/decel temporarily

Accel/decel hold command

Input terminal function selection n36 to n39

To hold acceleration, input accel/decel hold command. The output frequency is maintained when the aceel/decel hold command is input during acceleration or deceleration.
The stop command releases the accel/decel hold and the operation ramps to stop while inputting accel/decel hold command.
Set input terminal function selection (n36 to n39) to 16 (accel/decel hold command).



Time chart at accel/decel hold command input

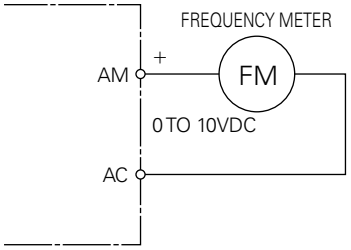
Using frequency meter or ammeter

Analog monitor selection n44

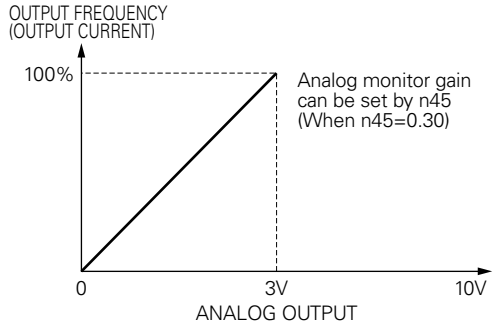
Analog monitor gain n45

Selects to output either output frequency or output current to analog output terminals AM-AC for monitoring.

Setting	Description
0	Output frequency
1	Output current



• Example of analog monitor gain adjustment
When using a frequency meter (full scale : 3V, 1mA) which indicates 0 to 60Hz at 0 to 3V.

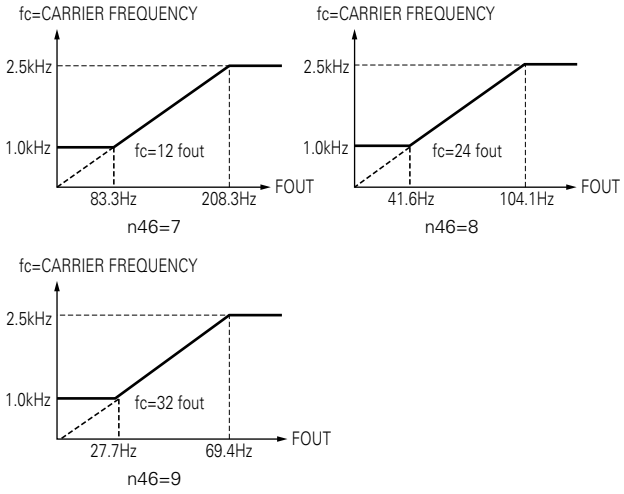


Reducing motor noise or leakage current

Carrier frequency n46

Sets inverter output transistor swiching frequency (carrier frequency).

Setting	Carrier frequency (Hz)	Metallic noise from motor	Current leakage
1	2.5	Higher	Smaller
2	5.0	↕	↕
3	7.5	↕	↕
4	10.0	Not audible	Larger
7 to 9	Synchronized type with lower limit 1kHz and upper limit 2.5Hz	–	–



Carrier frequency initial value differs depending on inverter capacity as follows :
• 10kHz (setting n46 = 4) : 200V three-phase 0.1 to 0.75kW
• 7.5kHz (setting n46 = 3) : 200V three-phase 1.5 to 3.7kW
200V single-phase, 1.5kW
400V three-phase, all models
To change the initial value 7.5kHz to 10kHz, continuous output current must be lowered. For details, refer to the instruction manual.

Selecting Method to Stop

Operator stop key selection

Operator stop key selection n06

Selects processing when STOP key is depressed during operation from control circuit terminal or communication.

Setting	Description
0	STOP key effective when running from terminals or communication. When STOP key is depressed, the inverter stops according to the setting of constant n04. At this time, the digital operator displays "SrP" alarm (blinking). This stop command is held in the inverter until both forward and reverse run commands are open or operation command from communication is "0".
1	STOP key ineffective when running from terminals or communication.

Selecting stopping method

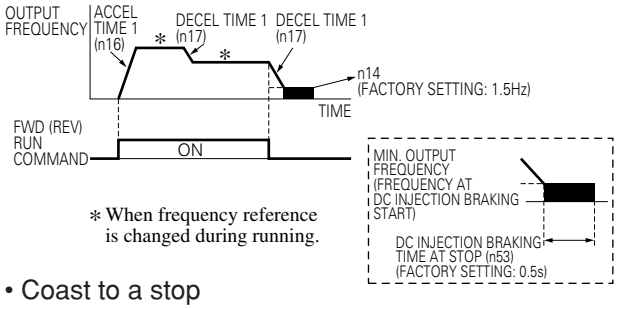
Stopping method selection n04

Selects the stopping method suitable for application.

Setting	Description
0	Deceleration to stop
1	Coast to stop

• Deceleration to stop

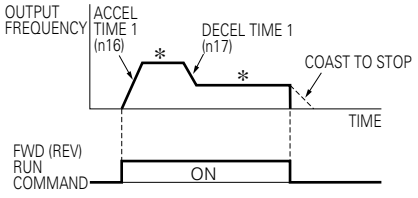
Example when accel/decel time 1 is selected


OUTPUT FREQUENCY
ACCEL TIME 1 (n16)
DECEL TIME 1 (n17)
DECEL TIME 1 (n17)
n14 (FACTORY SETTING: 1.5Hz)
TIME
FWD (REV) RUN COMMAND
ON
MIN. OUTPUT FREQUENCY (FREQUENCY AT DC INJECTION BRAKING START)
DC INJECTION BRAKING TIME AT STOP (n53) (FACTORY SETTING: 0.5s)

∗ When frequency reference is changed during running.

• Coast to a stop

Example when accel/decel time 1 is selected



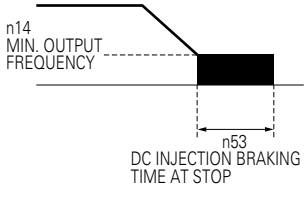
∗ When frequency reference is changed during running.

Applying DC injection braking

DC injection braking current n52

DC injection braking time at stop n53

When coasting to a stop is specified in stopping method selection (n04), DC injection braking at stop does not operate.



Building Interface Circuits with External Devices

Using input signals

Input terminal function selection n36 to n39

Multi-function input terminals S2 to S5 functions can be changed when necessary by setting constants n36 to n39, respectivery. The same value can not be set to different constant setting.

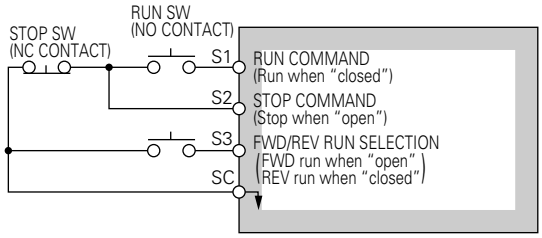
• Terminal S2 function : Set to n36 : Factory setting 2
• Terminal S3 function : Set to n37 : Factory setting 5
• Terminal S4 function : Set to n38 : Factory setting 3
• Terminal S5 function : Set to n39 : Factory setting 6

Setting	Function Name	Description	Ref. Page
0	FWD/REV run command (3-wire sequence selection)	Setting enabled only for n052	24
2	REV run command (2-wire sequence)	–	–
3	External fault (NO contact input)	Inverter stops by external fault signal input. Digital operator display is "EF□∗"	–
4	External fault (NC contact input)		
5	Fault reset	Resets fault. It is disabled with run signal entered.	–
6	Multi-step speed reference 1	–	18
7	Multi-step speed reference 2	–	
8	Multi-step speed reference 3	–	
10	Jog command	–	19
11	Accel/decel time select	–	19
12	External baseblock (NO contact input)	Motor coasts to stop by this signal input. Digital operator display "bb" (blinking).	–
13	External baseblock (NC contact input)		
14	Search command from max. output frequency	Speed search command signal	21
15	Search command from set frequency		
16	Accel/decel hold command	–	22
17	LOCAL/REMOTE selection	–	24
18	Communication/Control circuit terminal selection	–	24
19	Emergency stop fault (NO contact input)	Inverter stops by emergency stop signal input according to stopping method selection (n04). When frequency deceleration to a stop (n04=0) is selected, inverter decelerates to a stop according to decel time setting 2 (n19). Digital operator displays "SrP" (lights at fault, blinks at alarm).	–
20	Emergency stop alarm (NO contact input)		–
21	Emergency stop fault (NC contact input)		–
22	Emergency stop alarm (NC contact input)		–
34	UP/DOWN command	Setting is enabled only for n39.	24
35	Self-test	Setting is enabled only for n39.	–

∗ : A number 2 to 5 is displayed in □ corresponding to the number of terminal S2 to S5 respectively.

The set value displayed in ☐ is factory setting.

Terminal function at 3-wire sequence selection



LOCAL/REMOTE select (setting : 17)

Select operation reference by the digital operator or by the control circuit terminal.

LOCAL/REMOTE select is valid only during stop.

Open : Run by setting at run command selection (n02) and frequency reference selection (n03).

Closed : Run by frequency reference and run command from digital operator.

e.g. : When the digital operator/control circuit terminal selection setting is n02 = 1 and n03 = 2, 3 or 4

Open : Receives frequency reference (terminal FR, RP) and run command (terminals S1 to S5) from control circuit terminal

Closed : Receives frequency reference (setting at n07) and run command from digital operator.

Communication/control circuit terminal selection (setting : 18)

Selects operation reference by communication or by control circuit terminal. Communication/control circuit terminal selection is valid only during stop.

Open : Run according to the setting at n02 and n03 (operation method selection).

Closed : Run by frequency reference and run command from communication.

e.g. : When used for communication/control circuit terminal selection, set n02 = 1 and n03 = 2, 3 or 4

Open : Receives frequency reference (terminal FR) and run command (terminals S1 to S5) from control circuit terminal

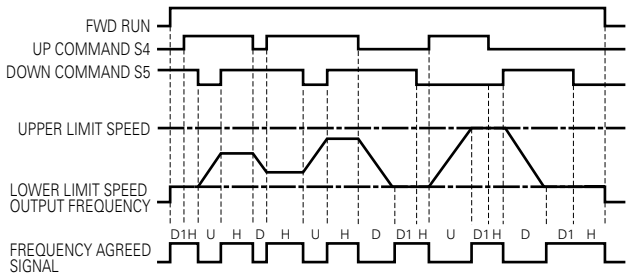
Closed : Receives frequency reference and run command from communication

UP/DOWN command (setting : n39 = 34)

With the FWD (REV) run command entered, accel/decel is enabled by inputting the UP or DOWN signals to control circuit terminals S4 and S5 without changing the frequency reference, so that operation can be perfomed at the desired speed. When UP/DOWN commands are specified by n39, any function set to n38 becomes disabled; terminal S4 becomes an input terminal for UP command and terminal S5 for DOWN command.

Control circuit terminal S4 (UP command)	Closed	Open	Open	Closed
Control circuit terminal S5 (DOWN command)	Open	Closed	Open	Closed
Operation status	Accel	Decel	Hold	Hold

* : Effective only when with option unit.


FWD RUN
UP COMMAND S4
DOWN COMMAND S5
UPPER LIMIT SPEED
LOWER LIMIT SPEED
OUTPUT FREQUENCY
FREQUENCY AGREED
SIGNAL
D1 H U H D H U H D D1 H U D1 H D D1 H

Time chart at UP/DOWN command input

U = UP (accelerating) status
D = DOWN (decelerating) status
H = HOLD (constant speed) status
U1 = UP status, clamping at upper limit speed
D1 = DOWN status, clamping at lower limit speed

Notes :
- When UP/DOWN command is selected, the upper limit speed is set regardless of frequency reference.
  Upper limit speed = Max. output frequency (n09) × Frequency reference upper limit (n30) /100
- The lower limit speed is the largest value among min. output frequency (n14) and frequency reference lower limit (n31).
- When the FWD (REV) run command is input, operation starts at the lower limit speed without UP/DOWN command.
- When the jog command is input while running by the UP/DOWN command, the jog command has priority. The UP/DOWN command can not be input together with multi-step speed reference.
- By setting hold output frequency memory selection (n62) to 1, the output frequency during hold can be saved.

Setting at n62	Description
0	Output frequency during hold is not saved.
1	After 5 sec. of hold state, the output frequency during hold is saved and the operation will restart with the saved output frequency

Using output signals

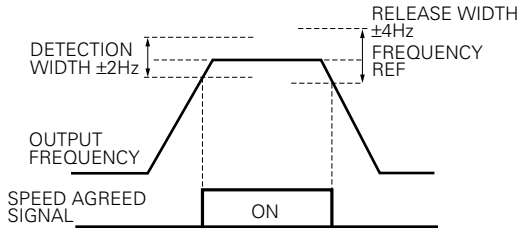
Multi-function output terminal function selection n40

Multi-function output terminal MA and MB, functions can be changed when necessary by setting constants n40.

• Terminal MA and MB functions : Set to n40

Setting	Function Name	Description	Ref. Page
0	Fault	"Closed" (ON) when inverter fault occurs.	–
1	Running	"Closed" (ON) when FWD or REV run command is input, or when the inverter outputs voltage.	–
2	Speed agreed	–	Figure below
3	Zero speed	"Closed" (ON) when the inverter output frequency is less than min. output frequency	–
4	Frequency detection 1 (output frequency ≧ frequency detection level)	–	21
5	Frequency detection 2 (output frequency ≦ frequency detection level)	–	
6	Overtorque detection (NO contact output)	–	20
7	Overtorque detection (NC contact output)	–	
10	Minor fault (alarm display)	–	28
11	During baseblock	"Closed" (ON) when the inverter output is shut off.	–
12	Operation mode	"Closed" (ON) when "LOCAL" is selected by LOCAL/REMOTE selection	–
13	Inverter run ready	"Closed" (ON) when the inverter is ready to operate without any fault.	–
14	In fault retry	"Closed" (ON) during fault retry.	–
15	Low voltage (UV) detected	"Closed" (ON) when the inverter is detecting low voltage.	–
16	In REV run	–	–
17	In speed search	"Closed" (ON) during speed search of inverter.	21
18	Data output from communication	By command from MEMOBUS communication, multi-function output terminal is operated independently from the inverter operation.	–

Factory settings n40 : 1



Setting example of "Speed agreed signal" (setting = 2)

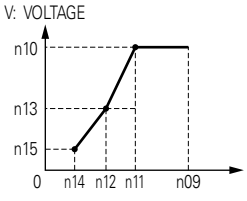
Adjusting torque according to application

Max. output frequency	n09
Max. voltage	n10
Max. voltage output frequency	n11
Mid. output frequency	n12
Mid. output frequency voltage	n13
Min. output frequency	n14
Min. output frequency voltage	n15
Torque compensation gain	n63

Adjust motor torque by using "V/f pattern" and "full-range automatic torque boost".

V/f pattern setting

Set V/f pattern by n09 to n15 as described below. Set each pattern when using a special motor (high-speed motor, etc.) or when requiring special torque adjustment of machine.



Be sure to satisfy the following conditions for the setting of n09 to n15.
n14 ≦ n12 < n11 ≦ n09
If n14 = n12 is set, the set value of n13 is disabled.

Constants No.	Name	Unit	Setting Range	Initial Setting
n09	Max. output frequency	0.1Hz	50.0 to 400Hz	60.0Hz
n10	Max. voltage	1V	1 to 255V	200V*
n11	Max. voltage output frequency (base frequency)	0.1Hz	0.2 to 400Hz	60.0Hz
n12	Mid. output frequency	0.1Hz	0.1 to 399Hz	1.5Hz
n13	Mid. output frequency voltage	1V	1 to 255V	12V*
n14	Min. output frequency	0.1Hz	0.1 to 10.0Hz	1.5Hz
n15	Min. output frequency voltage	1V	1 to 50V	12V*

Note : Refer to the instruction manual for details of setting.
* : Twice for 400V class.

Full-range automatic torque boost

Motor torque requirement changes according to load conditions. Full-range automatic torque boost adjusts voltage of V/f pattern according to the requirement. The VS mini J7 automatically adjusts the voltage during constant-speed operation as well as during acceleration. The required torque is calculated by the inverter.

Normally, no adjustment is necessary for torque compensation gain (n63 factory setting = 1.0). When the wiring distance between the inverter and the motor is long, or when the motor generates vibration, change the torque compensation gain. In these cases, reset the V/f pattern (n09 to n15).

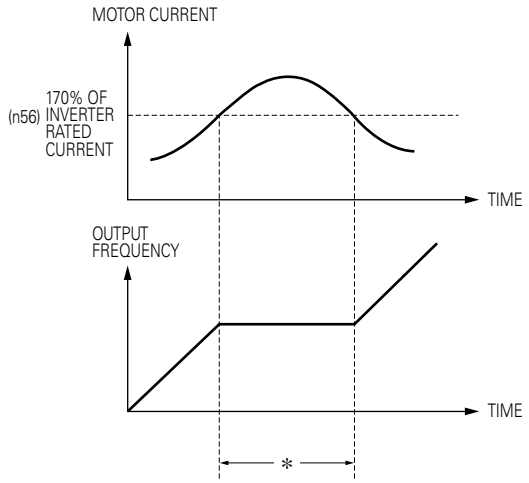
The set value displayed in [ ] is factory setting.

Preventing motor from stalling (Current limit)

Stall prevention (current limit) level during accel n56
Stall prevention (current limit) level during running n57
Stall prevention during decel n55

Stall prevention (current limit) level during accel (n56)

Automatically adjusts the output frequency and the output current according to the load to continue operation without stalling the motor.
During acceleration if the output current exceeds 170% of the inverter rated current [the value set for n56], acceleration stops and then frequency is maintained.
When the output current goes down to 170% [the value set for n56], acceleration starts. Inverter rated current becomes 100%.



*Holds the acceleration to prevent the motor from stalling.

[Factory setting of n56 = 170%
When set to 200%, this function becomes disabled.]

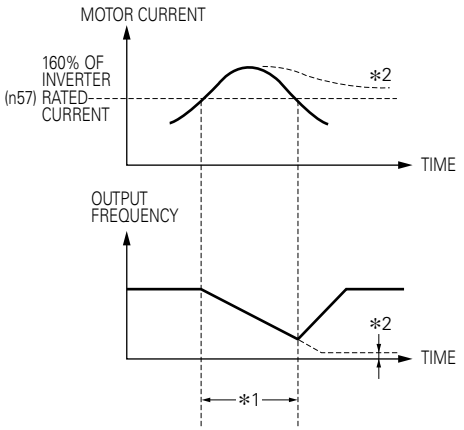
In the constant output area [output frequency ≧ max. voltage output frequency (n11)], the stall prevention level during acceleration is automatically decreased by the following equation.

Stall prevention (current limit) level during accel in constant output area

$$= 170\% \text{ [n56 setting]} \times \frac{\text{Max. voltage output frequency (n11)}}{\text{Output frequency}}$$

Stall prevention (current limit) level during running

During agreed speed if the output current exceeds 160% of the inverter rated current [the value set for n57], deceleration starts.
When the output current exceeds 160% [the value set for n57], deceleration continues.
When the output current goes down to the value, acceleration starts, up to the set frequency.



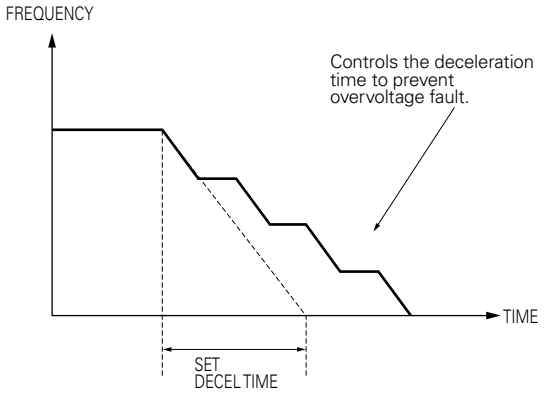
*1. Decreases frequency to prevent the motor from stalling.
*2. If the output current does not become set level or less, the operation will be held at the min. output frequency.

[Factory setting of n57 = 160%
When set to 200%, this function becomes disabled.]

Stall prevention (current limit) during deceleration (n55)

To prevent overvoltage during deceleration, the inverter automatically extends the deceleration time according to the value of main circuit DC voltage.

Setting	Stall prevention during deceleration
0	Provided
1	Not Provided



Decreasing Motor Speed Fluctuation

Slip compensation

Slip compensation gain n66

Motor no-load current n65

As the load becomes larger, the motor speed is reduced and motor slip value is increased when V/f control mode is selected.
The slip compensating function controls the motor speed at a constant value even if the laod varies. When inverter output current is equal to the motor rated current, compensation frequency is added to the output frequency.

$$\text{Compensation frequency} = \text{Motor rated slip value (n64)} \times \frac{\text{Output current} - \text{Motor no-load current (n65)}}{\text{Motor rated current (n32)} - \text{Motor no-load current (n65)}} \times \text{Slip compensation gain (n66)}$$

Constants

Constant No.	Function Name	Setting Unit	Setting Range	Factory Setting
n32	Motor rated current	0.1A	0 to 120% of inverter rated current	*
n64	Motor rated slip	0.1Hz	0.0 to 20.0Hz	*
n66	Slip compensation gain	0.1	0.0 to 2.5	0.0
n65	Motor no-load current	1%	0 to 99% (100% = motor rated current n32)	*
n67	Slip compensation primary delay time	0.1s	0.0 to 25.5s When 0.0s is set, delay time becomes 2.0s	2.0s

* : Differs depending on inverter capacity.

Notes : • When output frequency < min. output frequency (n14), slip compensation is not performed.
• During regenerative operation, slip compensation is not performed.

Motor Protection

Motor overload detection

Motor rated current n32

Electronic thermal motor protection selection n33

Electronic thermal motor protection time constants setting n34

The VS mini J7 protects against motor overload with a built-in electronic thermal overload relay.

Motor rated current (electric thermal base current) (n32)

Set to the rated current value shown on the motor nameplate.

Motor overload protection selection (n33)

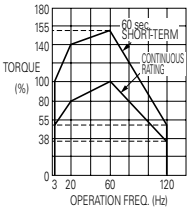
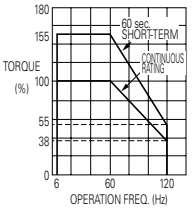
Setting	Electronic Thermal Characteristics
0	For standard motor
1	For inverter motor
2	Electronic thermal motor protection not provided

Motor overload protection selection (n34)

The initial value is 8 min. of standard rating. Set 5-min. rating for short-term rating.
When operating with one inverter connected to one motor, an external thermal relay is not required.
When operating severad motors with one inverter, install a thermal relay on each motor.

Standard motors and inverter motors

Motors are classified into standard motors and inverter motors according to its cooling capabilities. Therefore, the motor overload function operates differently between motor types.

	Cooling Effect	Torque Characteristic	Electronic Thermal
Standard Motors	Since designed for operation with commercial power supply, cooling effect is lowered as speed lowered.	 BASE FREQUENCY 60Hz (V/f for 60Hz, 220V input voltage) As the motor temperature rise is controlled at low-speed operation, the load should be limited.	"OL1" error (motor overload protection) occurs when continuously operated at 50/60Hz or less at 100% load.
Inverter Motors	Designed for heat-resistant in case of lowered cooling capability in low-speed range (approx. 6Hz).	 BASE FREQUENCY 60Hz (V/f for 60Hz, 220V input voltage) For continuous operation in low-speed range, use inveter motors.	Electric thermal overload protection not activated even when continuously operated at 50/60Hz or less at 100% load.

☼ : ON ☼ : BLINKING ● : OFF

Alarms and Corrective Actions

Alarm Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
UV BLINKING	☼	Warning Does not output fault. Auto-matically recover after the fault eliminated	**UV (Main circuit low voltage)** Main circuit DC voltage drops below the low-voltage detection level while the inverter output is OFF. Detection level 200V class : Approx. 200V or less (for single-phase, approx. 160V or less) 400V class : Approx. 400V or less Control power fault : Control power fault detected while inverter stopped.	Check the following : • Power supply voltage • Main circuit power supply wiring is connected. • Terminal screws are securely tightened.
ov BLINKING			**OV (Main circuit overvoltage)** Main circuit DC voltage exceeds the overvoltage detection level while the inverter output is OFF. Detection level 200V class : Approx. 410V or more 400V class : Approx. 820V or more	Check the power supply voltage.
oH BLINKING			**OH (Cooling fin overheat)** Intake air temperature rises while the inverter is stopped.	Check the intake air temperature.
CAL BLINKING			**CAL (MEMOBUS in waiting)** After power ON with n02 (operation mode selection) set to 2 and n03 (frequency reference selection) to 6, normal transmission data is not received from PLC.	Check communication devices and transmission signals.
oP□			**OP (Setting error)** OPE □ (Constant setting error when setting constants from MEMOBUS) OP1 : Same set values are input to constants n36 to n39 for multi-function input selection. OP2 : Improper size comparison of setting for V/f constants n09, n11, n12 and n14 OP3 : Set value of motor rated current (n32) exceeds 150 % of inverter rating. OP4 : Frequency reference upper limit (n30) < Frequency reference lower limit (n31) OP5 : Improper size comparison among jump frequency 1 (n49), 2 (n50)	Check set value.
oL3 BLINKING	☼		**OL3 (Overtorque detection)** Inverter output current exceeds overtorque detection level (n60)	Decrease load, increase accel/decel time.
SEr BLINKING			**SER (sequence error)** Inverter received LOCAL/REMOTE selection command signal, or communication/control circuit selection command signal during operation.	Check external circuit (sequence).
bb BLINKING	☼ or ☼		**BB (external base blocked)** Inverter stops output upon receiving an external base block signal. (Note : Resetting external base block signal restarts operation.	Check external circuit (sequence).
EF BLINKING			**EF (FWD and REV command simultaneous input)** FWD command and REV command from control circuit terminal are simultaneously "Closed". When command is "Closed" for 500ms and more, inverter stops operation by setting stopping method selection (n04).	Check external circuit (sequence).
STP BLINKING			**STP (Operator function stop)** STOP/RESET key is pressed during running by FWD or REV command from control circuit terminal or communication. In this case, inverter stops operation by setting of stopping method selection (n04). **STP (emergency stop)** At receiving emergency stop alarm signal, inverter stops operation by setting of stopping method selection (n04).	• Open FWD or REV command from control circuit terminal. • Check external circuit (sequence)
FAn BLINKING			**FAN (Cooling fan fault)** Cooling fan is locked.	Check the followings : • Cooling fan • Power supply connection of cooling fan
CE BLINKING			**CE (MEMOBUS communication fault)** Communication data are not received normally	Check communication devices and communication singals.

Faults and Corrective Actions

Fault Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
oC	● ☼	Protective Operation Output is shutt OFF and motor coasts to a stop.	**OC (overcurrent)** Inverter output current momentarily exceeds approx. 250 % of rated current.	Check the following and restart: • Short-circuit or grounding at inverter output side • Excessive load GD² • Extremely rapid accel/decel time (n16 to n19) • Special motor used • Starting motor during coasting • Motor of a capacity greater than the inverter rating has been started. • Magnetic contactor open/closed at the inverter output side
			(control power supply fault) Voltage fault of control power supply is detected.	Turn OFF, and ON power. If the fault remains, replace the inverter.
ou			**OV (main circuit overvoltage)** Main circuit DC voltage exceeds the overvoltage detection level due to excessive regenerative energy from the motor. Detection level 200V class : approx. 410V and more 400V class : approx. 820V and more	• Insufficient decel time (constants n17 and n19) • Large minus load at lowering (elevator, etc.) ⬇ • Increase decel time. • Connect optional braking resistor.
Uu 1			**UV1 (main circuit low-voltage)** Main circuit DC voltage drops below the low-voltage detection level while inverter output is ON. Detection level 200V class : approx. 200V and less (approx. 160V and less for single-phase) 400V class : approx. 400V and less	• Reduction of input power supply voltage • Open phase of input supply • Occurrence of momentary power loss ⬇ Check the following: • Power supply voltage • Main circuit power supply wiring is connected • Terminal screws are securely tightened.
oH			**OH (cooling fin overheat)** Temperature rise due to inverter overload operation or intake air temperature rise.	• Excessive load • Improper V/f pattern setting • Insufficient accel time if the fault occurs during acceleration • Intake air temperature exceeding 50 ℃ • Cooling fan is stopped. ⬇ Check the following: • Load size • V/f pattern setting (n09 to n15) • Intake air temperature
oL 1			**OL1 (motor overload)** Motor overload protection activated by built-in electronic thermal overload relay.	• Check the load size and V/f pattern setting (n09 to n15) • Set n36 to the rated current on motor nameplate.
oL2			**OL2 (inverter overload)** Inverter overload protection activated by built-in electronic thermal overload relay.	• Check the load size and V/f pattern setting (n09 to n15) • Check the inverter capacity
oL3			**OL3 (overtorque detection)** When V/f mode is selected, inverter output current exceeds the overtoraue detection level (n60). If overtorque is detected, inverter operates according to the setting at n59)	Check the driven machine and correct the cause of the fault, or increase the value of n60 up to the highest allowable value for the machine.
GF			**GF (ground fault)*** Inverter output ground fault current exceeds the inverter rated current.	Check the connection at output side wiring and the motor.

* This alarm detects ground fault in the motor winding. It cannot protect low-resistant ground fault in the motor cable, the terminal block, etc.

Faults and Corrective Actions (Cont'd)

Fault Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
EF□		Protection Operation Output is shutt OFF and motor coasts to a stop.	**EF□ (external fault)** Received an external fault signal. EF0 : External fault command from MEMOBUS EF2 : External fault input from control circuit terminal S2 EF3 : External fault input from control circuit terminal S3 EF4 : External fault input from control circuit terminal S4 EF5 : External fault input from control circuit terminal S5	Check external circuit (sequence).
F00			**CPF-00 (CPF : control circuit fault)** Communication with digital operator is disabled even 5 sec. after power is ON.	Turn OFF power, then turn ON power again. If fault remains, replace the inverter.
F01			**CPF-01** Communication fault occurrs for 5 sec. or more after communication started with digital operator	Turn OFF power, then turn ON power again. If fault remains, replace the inverter.
F04	● ☼		**CPF-04** EEPROM fault of inverter control circuit	• Save all the constant data, then initialize the constants (refer to page 17 for initialization of constants) • Turn OFF power, then ON again. If the fault remains, replace the inverter.
F05			**CPF-05** A/D converter fault of inverter control circuit	Turn OFF power, and ON again. If fault remains, replace the inverter.
F06			**CPF-06** • Optional card connection fault • Non-applicable option card is connected.	• Turn OFF power and properly connect the card, then turn ON power. • Check the inverter software NO (n79).
F07			**CPF-07** Digital operator control circuit (EEPROM, A/D converter fault	Turn OFF power once, then turn ON power again. If fault remains, replace the inverter.
CE			**CE (MEMOBUS fault)** Communication data cannot be received properly.	Check communication device and signals.
STP	☼ ☼ or ● ☼	Stops according to constant setting	**STP (emergency stop)** At receiving an emergency stop fault signal, inverter stops output by setting stopping method selection (n04)	Check external circuit (sequence).
OFF	● ●	Protective Operation Output is shutt OFF and motor coasts to a stop.	• Insufficient power supply voltage • Control power supply fault • Hardware fault	Check the following: • Power supply voltage • Main circuit power supply wiring • Terminal screws are securely tightened. • External control circuit (sequence) • Replace the inverter

Inverter

Selection

- Use a DC reactor (option) or an AC reactor (option) on the inverter power side when the inverter is connected directly to a large-capacity power transformer (600kVA and over within 10m distance) or when a phase advance capacitor is switched. Otherwise excess peak current may occur in the power feed circuit and the converter section may be damaged. A DC reactor or an AC reactor is also required when a thyristor converter such as a DC drive is connected to the same power system.
- When a special motor is used or more than one motor is driven in parallel with a single inverter, select the inverter capacity so that 1.1 times of the total motor rated current does not exceed the inverter rated output current.
- The starting and accelerating characteristics of the motor driven by an inverter are restricted by the overload current ratings of the inverter. Compared to running with commercial power supply, lower touque output should be expected. If high starting torque is required, use an inverter of higher capacity or increase the capacities of both the motor and the inverter.
- When an error occurs, a protective circuit is activated and the inverter output is turned OFF. However, the motor cannot be stopped immediately. Use a mechanical brake and hold the equipment for a fast stop if necessary.
- Terminals +1 and +2 are for DC reactor (option). Do not connect other equipment.

Installation

- Avoid oil mist or dust. Place the inverter in a clean area or house it in a totally-enclosed case so that no contamination enters. To use the totally-enclosed case, select the cooling method and panel dimensions so the inverter ambient temperature will be within the allowable range.
- Do not install the inverter on flammable material, such as wood.
- Install the inverter on a wall with the longer side in the vertical position.

Setting

- The inverter can be driven at an output frequency of up to 400Hz with the digital operator. Setting errors may create a dangerous situation. Set the upper limit with the upper limit frequency setting function. (Maximum output frequency in external input signal operation is preset to 60Hz at the factory.)
- Large DC injection braking operating voltages and times may cause motor overheating.
- Motor accel/decel time is determined by the motor generating touque, load torque, and load inertia WK^2 (GD^2). If the stall prevention function is activated during accel/decel, set the accel/decel time longer. After the stall prevention function is activated, the accel/decel time is extended to a length that the inverter can handle. To shorten the accel/decel time, increase the capacity of the inverter and possibly the motor.

Operation

- Applying power to inverter output terminals U/T_1, V/T_2, W/T_3 will damage the inverter. Double check wiring and sequence before turnig the power ON.
- If magnetic contactor (MC) is used on the primary side of the inverter, do not use the MC for starting and stopping the inverter. Otherwise, the inverter life may be reduced.
- After turning power to the inverter OFF, electric charges in the internal capacitors are retained temporarily. Wait until the charge LED goes off before touching the inside of the inverter.

Peripheral Devices

Installation and selection of molded-case circuit breaker

On the input power side, a molded-case circuit breaker (MCCB) to protect inverter primary wiring should be installed. The inverter power-factor (depending on power voltage, output frequency, and load) must be taken into account for selecting MCCB. For standard settings, see page 36. If a full electromagnetic MCCB is to be used, select a larger capacity because the operating characteristics are altered by harmonic current. A leakage current breaker threshold of 200mA and above, or of inverter (suppressing high frequency) use is recommended.

Use of input side magnetic contactor

The inverter can be used without an input side magnetic contactor (MC). An input MC can be used to prevent an automatic restart after recovery from an external power loss during remote control operation. However, do not use the MC frequently for start/stop operation, or it will lead to a reduced reliability. When the digital operator is used, automatic restart after power failure is disabled, so that MC starting is impossible. Although the MC can stop the inverter, regeneration braking is disabled and the motor coasts to a stop.

Use of secondary magnetic contactor

In general magnetic contactors on the output of the inverter, for motor control should not be used. Starting a motor with the inverter running will cause large surge currents and the inverter overcurrent protector to trigger. If an MC is used for switching to commercial power supply, switch MC after the inverter and the motor stop. To switch during motor rotation, use the speed search command. (See page 21.)

Use of overload relay

The inverter includes an electronic thermal protective function to protect the motor from overheating. However, when multi-drive by one inverter is used, place a overload relay between the inverter and the motor. Set 2 in n33, and set the ovverload relay to the current nameplate value at 50Hz, or 1.1 times of that at 60Hz.

Power-factor improvement (elimination of phase advance capacitor)

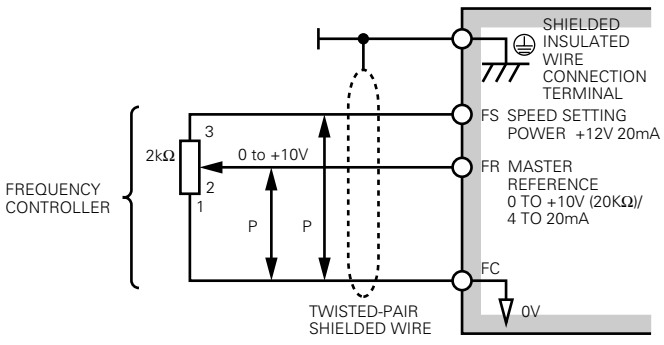
To improve the power-factor, install a DC reactor or an AC reactor on the inverter's power side. Power-factor improvement capacitor or surge suppressors on the inverter output side will be damaged by the harmonic component in the inverter output. Also, the overcurrent caused in the inverter output will trigger the overcurrent protection. To avoid this, do not use capacitors or surge suppressors in the inverter's output. To improve the power-factor, install an AC reactor on the inverter primary side.

Radio frequency interference

Because the inverter I/O (main circuit) contains a higher harmonics component, it may emit RFI noise to communication equipment (AM radio, etc.) near the inverter. Use a noise filter to decrease the noise. Use of a metalic conduit between the inverter and motor and grouding the conduit is also effective. Proper routing of input and output lead is also recommended.

Wire thickness and cable length

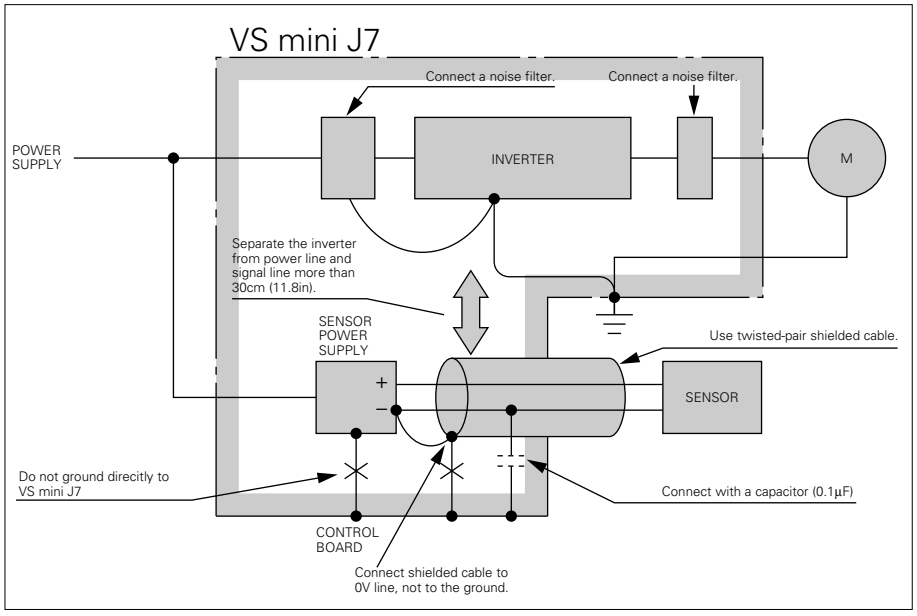
If a long cable is used between the inverter and a motor (especially when low frequency is output), motor torque decreases because of voltage drop in the cable. Use sufficiently thick wire. If a long cable is used and inverter carrier frequency (main transistor switching frequency) is high, harmonic leakage current from the cable will increase to affect the inverter unit or peripheral devices. Reduce the inverter carrier frequency.
When a digital operator is to be installed separately from the inverter, use the YASKAWA remote interface and special connection cable (option). For remote control with analog signals, connect the operating signal terminal and the inverter within 30m (98.4ft) of the inverter. The cable must be routed separately from power circuits (main circuit and relay sequence circuit) so that it is not subjected to inductive interference by other equipment. if frequencies are set not only from the digital operator but also with external frequency controller, use twisted-pair shielded wire as shown in the following figure and connect the shielding to terminal ⏚ .



Noise Countermeasures

The low-noise type uses high-carrier frequency PWM control, and compared to the low-carrier type tends to suffer from increased electromagnetic interference (EMI). Following are suggestions that may be effective in reducing EMI effects in your installation:

- Lower the carrier frequency (constant n46) and the interference will be reduced.
- A line noise filter is effective in eliminating sensor malfunction or AM radio static (see page 35).
- To eliminate inductive noise from the inverter power line, separate the signal lines [recommended 30cm (11.8in), minimum 10cm (3.94in)] and use twisted-pair shielded cable.



From the JEMA report

Current Leakage Countermeasures

A floating capacitance exists between the inverter power line and other drive lines, and between ground (earth) and the motor. This may carry high-frequency leakage current and affect other equipment. This phenomenon varies with the carrier frequency and the wiring distance between inverter and motor. The following measures may help to minimize the effects.

	Phenomenon	Countermeasures
Current Leakage to Ground (earth)	Malfunction of ground fault interrupters and leakage relays	• Lower the carrier frequency (constant n46) • Use a ground fault interrupter resistant to high frequencies (e. g. Mitsubishi Electric NV Series)
Inter-line Leakage Current	Malfunction of external thermal overload relays due to high-frequency component of leakage current	• Lower the carrier frequency (constant n46) • Use an inverter with a built-in electronic thermal overload relay.

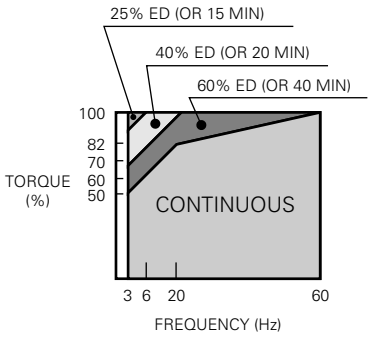
Wiring distance between inverter and motor, and setting of carrier frequency

Wiring Distance	Up to 50m (164.0ft)	Up to 100m (328.1ft)	More than 100m (328.1ft)
Allowable carrier frequency (Constant n46 set value)	10kHz or less (1 to 4, 7, 8, 9)	5kHz or less (1, 2, 7, 8, 9)	2.5kHz or less (1, 7, 8, 9)

Motor

Application for Existing Standard Motors

A standard motor driven by the inverter generates slightly less power than it does when it is driven with commercial power supply.
Also, the cooling effect deteriorates in low speed range so that the motor temperature rise increases. Reduce load torque in the low speed range. Allowable load characteristics of the standard motor are shown in the figure.
If 100% continuous torque is required in the low speed range, use an inverter duty motor.
Also, if input voltage is high (440V or more) or wiring distance is long, consider the withstand voltage of the motor. For details, contact your YASKAWA representative.



Allowable Load Characteristics of a Standard Motor

■High speed operation

When the motor is used above 60Hz, the motor mechanical design should be verified. Contact your motor manufacturer.

■Torque characteristics

Motor torque characteristics vary when the motor is driven by an inverter instead of commercial power supply. Check the load torque characteristics of the machine to be connected.

■Vibration

Because of the high carrier modulation technique for PWM control, the VS mini J7 reduces motor vibration to a level equal to running with a commercial power supply. Larger vibrations may occur under the following conditions:

・Response at resonant frequency of the mechanical system.
Special care is required if a machine which has previously been driven at a constant speed, is to be driven at varying speeds. Installation of antivibration rubber padding under the motor base and prohibited frequency control are recommended.

・Rotator residual imbalance
Special care is required for operation at frequencies higher than 60Hz.

■Noise

Inverter operation is as quiet as operation with commercial power supply: At above rated speed (60Hz), noise may increase by motor cooling fan.

Application for Special Purpose Motors

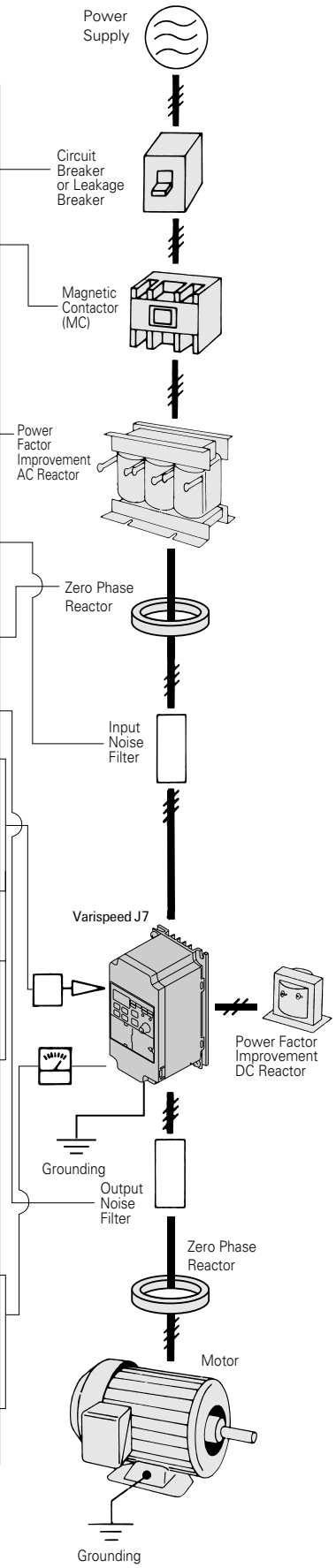
Synchronous Motors	Contact your YASKAWA representative for selecting inverter since starting current and rated current is larger than those of standard motor. Be careful when several motors are turned ON and OFF individually at group control. They may step out.
Pole Change Motors	Select the inverter with a capacity exceeding the rated current of each pole. Pole change should be made only after the motor stops. If a pole changed while the motor is rotating, the regenerative overvoltage or overcurrent protection circuit is activated and the motor coasts to a stop.
Submersible Motors	Since the rated current of underwater motors is large compared with general purpose motors, select an inverter with a larger capacity. If the wire length between the inverter and the motor is large, use cables with sufficiently large diameter.
Explosion-proof Motors	Explosion-proof motors which are applied to an inverter must be approved as explosion-proof equipment. The inverter is not explosion-proof and should not be located where explosive gases exist.
Geared Motors	Lubrication method and continuous rotation limit differ with manufacturers. When oil lubrication is employed, continuous operation only in low speed range may cause burnout. Before operating the motor at more than 60Hz you should consult the motor manufacturer.
Single-phase Motors	Single-phase motors are not suitable for variable speed operation with an inverter. If the inverter is applied to a motor using a capacitor stack, a high harmonic current flows and the capacitor may be damaged. For split-phase start motors and repulsion start motors, the internal centrifugal switch will not be actuated and the starting coil may be burnd out. Therefore, use only 3-phase motors.

Power Transmission Mechanism (Gear Reduction, Belt, Chain, etc.)

When gear boxes and change/reduction gears lubricated with oil are used in power transmission systems, continuous low speed operation decreases the oil lubrication function. Also, operation at more than 60Hz may result in noise, reduced life, etc.

OPTIONS AND PERIPHERAL UNITS

Purpose	Name	Model (Parts Code No.)	Description	Ref, page
Protection of inverter wiring	Molded-case circuit braker (MCCB) or ground fault interrupter*	NF30	To protect inverter wiring, always install it on the power supply side. Use a ground fault interrupter with resistance to high frequencies.	36
Controlling the power supply by sequence	Magnetic contactor	HI-□J	Install to close/break the power circuit by sequence. Always use a surge suppressor on the coil.	36
Preventing output of open/close surge current	Surge suppressor	DCR2-□	Absorbs surge current by opening and closing of magnetic contactors and control relays. Must be installed on magnetic contactors or control relays near the inverter.	36
Isolation of I/O signals	Isolator	DGP□	Isolates the inverter input and output signals to reduce noise.	37
Improvement of inverter input power factor	AC reactor	UZBA-B	When the inverter input power factor is to be improved, mount on the input side. With large-capacity power supplies (600kVA or higher), install an AC reactor.	39
	DC reactor	UZDA-B		38
Reducing effects of radio and controller noise	Input noise filter	LNFB-□ [Single-phase] LNFD-□ [3-phase]	Reduces noise through the inverter input power system or wirings. Install as close to the inverter as possible.	41
	Finemet zero-phase reactor to reduce radio noise	F6045GB (FIL001098) F11080GB (FIL001097)	Reduces noise from the line that sneaks into the inverter input power system. Insert as close to the inverter as possible. Can be used on both the input side and output side.	40
	Output noise filter	LF-□	Reduces noise as the inverter output wirings. Install as close to the inverter as possible.	42
Operating inverter externally	Digital operator for remote operation	JVOP-144 (with volume) JVOP-146 (without volume)	Use in combination with the remote interface unit (SI-232/J7) and extension cable for remote operation.	43
	Cable for remote interface	(72606-WV001) (1m)	Use to control digital operator when using remote interface.	43
		(72606-WV003) (3m)		
	Remote interface unit for remote operation	SI-232/J7	When using the remote control for the digital operator, connect to the inverter as interface to input data. Also use for RS-232C MEMOBUS communication.	43
Controlling the inverter by MEMOBUS communication	RS-422/485 interface unit for MEMOBUS communication	SI-485/J7	Use for RS-422 for RS-485 MEMOBUS communication with the host controller. The communication cable connector is included with this unit.	43
Simple mounting of inverter on control board inside the enclosure	DIN rail mounting attachment	(72606-EZZ08122A) [W: 68mm] (72606-EZZ08122B) [W: 108mm] (72606-EZZ08122C) [W: 140mm]	Attachment to mount inverter on DIN rail. Attach to rear of inverter.	–
External setting and monitoring of frequency and voltage	Frequency meter	DCF-6A	Used to set and monitor frequency externally.	42
	Frequency setter	(RH000739)		
	Frequency setting knob	CM-3S		
	Output voltmeter	SCF-12NH	Used to monitor output voltage. The voltmeter can be used only with PWM inverters.	42
Frequency reference input, and adjusting of frequency meter and ammeter scales	Frequency meter adjusting potentiometer	(RH000850)	Used to adjust frequency meter and ammeter scales.	42



*When using a ground fault interrupter, select one not affected by high frequencies. To prevent malfunctions, the current should be 200mA or more and the operating time 0.1s or more.
Recommended ground fault interrupters:
- NV series by Mitsubishi Electric Co., Ltd.
- EG, SG series by Fuji Electric Co., LTD.

Molded-Case Circuit Breaker (MCCB) and Magnetic Contactor (MC)

Be sure to connect a MCCB between the power supply and the input AC reactor.
Connect a MC if required.

Molded-Case Circuit Breaker (MCCB)

Power Supply Magnetic Contactor (MC)

200V Three-phase Input Series

Motor Capacity kW	VS mini J7 Model CIMR-J7□A□	Molded-Case Circuit Breaker (MCCB)				Magnetic Contactor (MC)	
		Without Reactor		With Reactor		Without Reactor	With Reactor
		Model	Rated Current A	Model	Rated Current A	Model	Model
0.1	20P1	NF30	3	NF30	3	HI-11J	HI-11J
0.2	20P2	NF30	3	NF30	3	HI-11J	HI-11J
0.4	20P4	NF30	5	NF30	5	HI-11J	HI-11J
0.75	20P7	NF30	10	NF30	10	HI-11J	HI-11J
1.5	21P5	NF30	15	NF30	10	HI-15J	HI-11J
2.2	22P2	NF30	20	NF30	15	HI-20J	HI-15J
3.7	23P7	NF30	30	NF30	20	HI-35J	HI-25J

200V Single-phase Input Series

Motor Capacity kW	VS mini J7 Model CIMR-J7□A□	Molded-Case Circuit Breaker (MCCB)				Magnetic Contactor (MC)	
		Without Reactor		With Reactor		Without Reactor	With Reactor
		Model	Rated Current A	Model	Rated Current A	Model	Model
0.1	B0P1	NF30	3	NF30	3	HI-11J	HI-11J
0.2	B0P2	NF30	5	NF30	5	HI-11J	HI-11J
0.4	B0P4	NF30	10	NF30	10	HI-11J	HI-11J
0.75	B0P7	NF30	15	NF30	15	HI-15J	HI-15J
1.5	B1P5	NF30	30	NF30	20	HI-35J	HI-20J

400V Three-phase Input Series

Motor Capacity kW	VS mini J7 Model CIMR-J7□A□	Molded-Case Circuit Breaker (MCCB)				Magnetic Contactor (MC)	
		Without Reactor		With Reactor		Without Reactor	With Reactor
		Model	Rated Current A	Model	Rated Current A	Model	Model
0.2	40P2	NF30	3	NF30	3	HI-11J	HI-11J
0.4	40P4	NF30	5	NF30	3	HI-11J	HI-11J
0.75	40P7	NF30	5	NF30	5	HI-11J	HI-11J
1.5	41P5	NF30	10	NF30	10	HI-11J	HI-11J
2.2	42P2	NF30	15	NF30	10	HI-15J	HI-11J
3.0	43P0	NF30	15	NF30	10	HI-15J	HI-11J
3.7	43P7	NF30	20	NF30	15	HI-20J	HI-15J

Surge Suppressor (Manufactured by Marcon Electronics)

Connect surge suppressors to coils in magnetic contactors, control relays, electromagnetic valves, and electromagnetic brakes used as the VS mini J7 peripheral units.

Coils of Magnetic Contactor and Control Relay			Surge Suppressor		
			Model	Specifications	Code No.
200V to 230V	Large-size Magnetic Contactors		DCR2-50A22E	220VAC 0.5 μF+200Ω	C002417
	Control Relay	LY-2, -3 HH-22, -23 MM-2, -4	DCR2-10A25C	250VAC 0.1 μF+100Ω	C002482
380 to 460V Units			RFN3AL504KD	1000VDC 0.5 μF+220Ω	C002630

Type DCR2-50A22E Type DCR2-10A25C Type RFN3AL504KD

Isolator

(Insulation Type DC Transmission Converter)

690-169

Performance

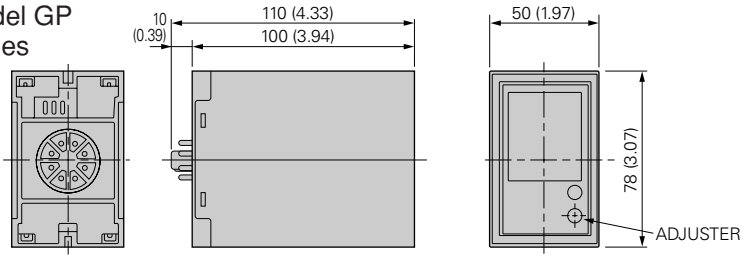
Allowance	±0.25% of output span [Ambient temp : 23°C, (73.4°F)]
Temperature Influence	With ±0.25% of output span [The value at ±10°C (±50°F) of ambient temp.]
Aux. Power Supply Influence	With ±0.1% of output span (The value at ±10% of aux. power supply)
Load Resistance Influence	With ±0.05% of output span (In the range of load resistance)
Output Ripple	With ±0.5%P-P of output span
Response Time	0.5 sec. or less (Time to settle to ±1% of final steady value)
Withstand Voltage	2000VAC for one min. (between each terminal of input, output, power supply and enclosure)
Insulation Resistance	20MΩ and above (by 500VDC megger) (between each terminal of input, output, power supply and enclosure)

Product Line

Model	Input Signal	Output Signal	Power Supply	Code No.
DGP2-4-4	0-10V	0-10V	100VAC	CON 000019.25
DGP2-4-8	0-10V	4-20mA	100VAC	CON 000019.26
DGP2-8-4	4-20mA	0-10V	100VAC	CON 000019.35
DGP2-3-4	0-5V	0-10V	100VAC	CON 000019.15
DGP3-4-4	0-10V	0-10V	200VAC	CON 000020.25
DGP3-4-8	0-10V	4-20mA	200VAC	CON 000020.26
DGP3-8-4	4-20mA	0-10V	200VAC	CON 000020.35
DGP3-3-4	0-5V	0-10V	200VAC	CON 000020.15

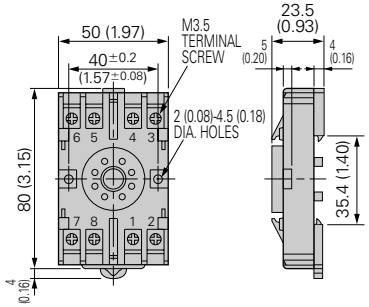
Dimensions in mm (inches)

Model GP Series

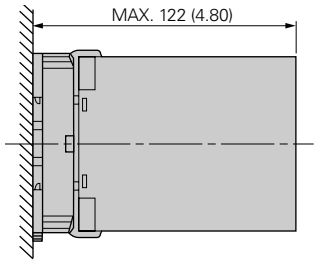


Adjuster's position or PC's varies due to models.

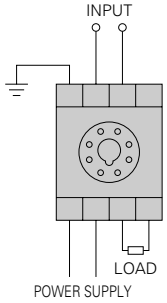
Socket



View of socket mounted



Connection



Terminal	Description
1	Output +
2	Output –
3	–
4	Input +
5	Input –
6	Grounding
7	Power supply
8	

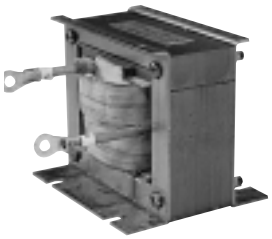
Cable Length

- 4 to 20mA : Within 100m
- 0 to 10V : Within 50m

Approx. Mass

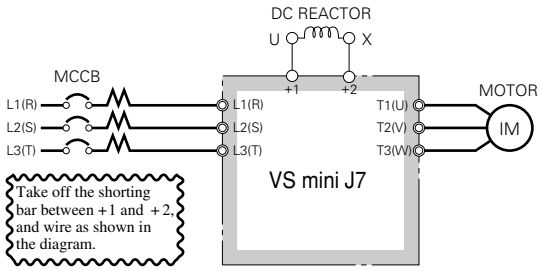
- Model GP Series : 350g
- Socket : 60g

DC Reactor (Model UZDA-B for DC circuit)

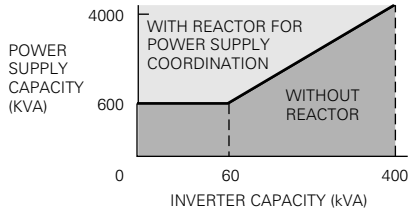


95-68088

Connection Example



When power capacity is significantly greater when compared to inverter capacity, or when the power-factor needs to be improved, connect the AC or DC reactor.
AC reactor can be used at the same time for harmonic measure.



200V Three-phase Input Series

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)										Approx. Mass kg (lb)	Loss W	Wire Size* mm² (in²)
					X	Y_1	Y_2	Z	B	H	K	G	ϕ1	ϕ2			
0.4 (0.5)	5.4	8	X010048	1	85 (3.35)	—	—	53 (2.09)	74 (2.91)	—	—	32 (1.26)	M4	—	0.8 (2.3)	8	2 (0.0031)
0.75 (1)																	
1.5 (2)	18	3	X010049	2	86 (3.39)	36 (1.41)	80 (3.15)	76 (2.99)	60 (2.36)	55 (2.17)	18 (0.71)	—	M4	M5	2.0 (5.6)	18	5 (0.0085)
2.2 (3)																	
3.7 (5)																	

Note: Contact your YASKAWA representative for three-phase, 200V, 0.1 to 0.2kW and single-phase, 200V, 0.1 to 3.7kW models.

400V Three-phase Input Series

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)										Approx. Mass kg (lb)	Loss W	Wire Size* mm² (in²)
					X	Y_1	Y_2	Z	B	H	K	G	ϕ1	ϕ2			
0.4 (0.5)	3.2	28	X010052	1	85 (3.35)	—	—	53 (2.09)	74 (2.91)	—	—	32 (1.26)	M4	—	0.8 (2.3)	9	2 (0.0031)
0.75 (1)																	
1.5 (2)	5.7	11	X010053		90 (3.54)	—	—	60 (2.36)	80 (3.15)	—	—	32 (1.26)	M4	—	1.0 (2.8)	11	2 (0.0031)
2.2 (3)																	
3.7 (5)	12	6.3	X010054	2	86 (3.39)	36 (1.41)	80 (3.15)	76 (2.99)	60 (2.36)	55 (2.17)	18 (0.71)	—	M4	M5	2.0 (5.6)	16	2 (0.0031)

Note: Contact your YASKAWA representative for three-phase, 400V, 0.2kW model.

* 75°C(167°F), IV cable, 45°C (113°F) ambient temperature, three or less wires connected.

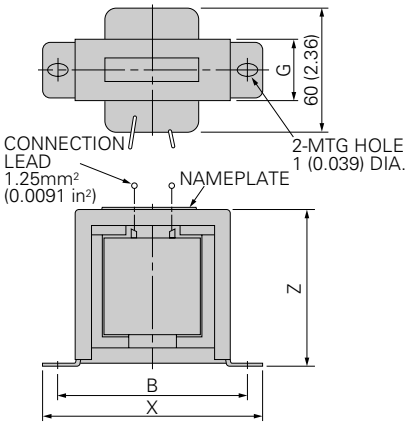


Figure 1

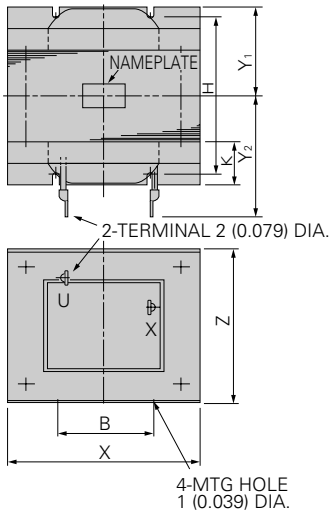
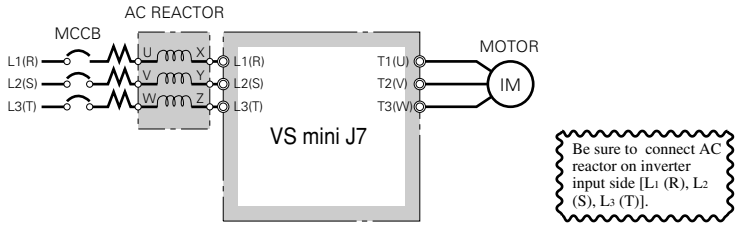


Figure 2

AC Reactor (Model UZBA-B for Input 50/60Hz)

96-72111

Connection Example



When power capacity is significantly greater when compared to inverter capacity, or when the power-factor needs to be improved, connect the AC or DC reactor. In order to supress high harmonic wave, DC reactor can be used with AC reactor.

200V Three-phase Input Series

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)													Approx. Mass kg (lb)	Loss W
					A	B	B_1	C	D	E	F	H	J	K	L	M		
0.1 (0.13)	2	7.0	X002764	1	120 (4.72)	71 (2.80)	—	120 (4.72)	40 (1.57)	50 (1.97)	105 (4.13)	20 (0.79)	M6	10.5 (0.41)	7 (0.28)	M4	2.5 (5.51)	15
0.2 (0.25)																		
0.4 (0.5)	2.5	4.2	X002553															
0.75 (1)	5	2.1	X002554															
1.5 (2)	10	1.1	X002489		130 (5.12)	88 (3.46)	—	130 (5.12)	50 (1.97)	65 (2.56)	130 (5.12)	22 (0.87)		11.5 (0.45)			3 (6.62)	25
2.2 (3)	15	0.71	X002490															30
3.7 (5)	20	0.53	X002491	2	130 (5.12)	88 (3.46)	114 (4.49)	105 (4.13)	50 (1.97)	65 (2.56)	130 (5.12)	22 (0.87)	M6	11.5 (0.45)	7 (0.28)	M5	3 (6.62)	35

Note: Contact your YASKAWA representative for single-phase, 200V, 0.1 to 1.5kW models.

400V Three-phase Input Series

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)												Approx. Mass kg (lb)	Loss W
					A	B	B_1	C	D	E	F	H	J	K	L	M		
0.2 (0.25)	1.3	18.0	X002561	1	120 (4.72)	71 (2.80)	—	120 (4.72)	40 (1.57)	50 (1.97)	105 (4.13)	20 (0.79)	M6	10.5 (0.41)	7 (0.28)	M4	2.5 (5.51)	15
0.4 (0.5)																		
0.75 (1)	2.5	8.4	X002562															
1.5 (2)	5	4.2	X002563		130 (5.12)	88 (3.46)		130 (5.12)	50 (1.97)	70 (2.76)	130 (5.12)	22 (0.87)		9 (0.35)			3 (6.62)	25
2.2 (3)	7.5	3.6	X002564															35
3.7 (5)	10	2.2	X002500							65 (2.56)				11.5 (0.45)		M5		43

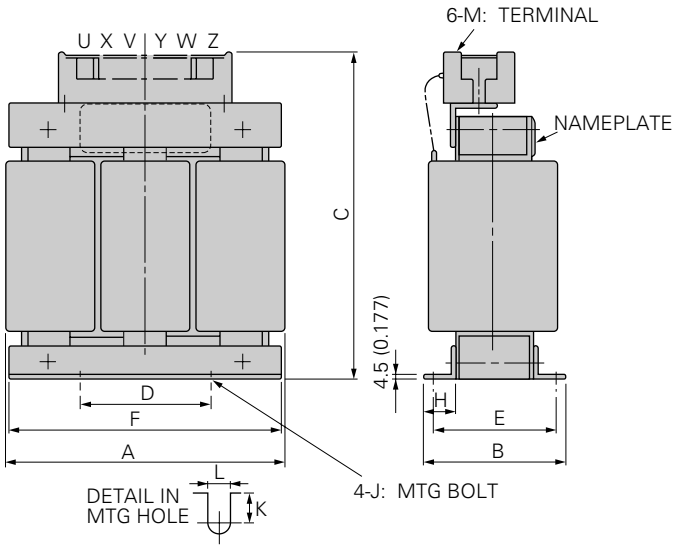


Figure 1

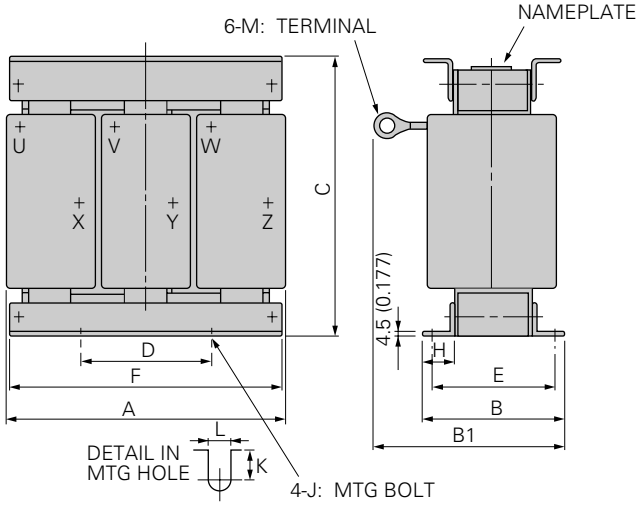
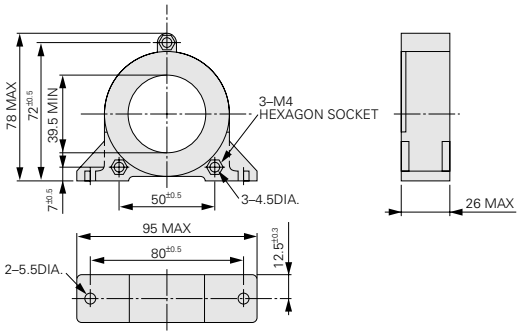


Figure 2

Zero Phase Reactor

Finemet Zero Phase Reactor to Reduce Radio Noise (Made by Hitachi Metals, Ltd.)

Note: Finemet is a registered trademark of Hitachi Metals, Ltd.



Model F6045GB

200V Three-phase Input Series

Inverter		Finemet Zero Phase Reactor			
Model	Recommended Wire Size mm²	Model	Code No.	Qty.	Wiring Method
CIMR-J7□A20P1	2	F6045GB	FIL001098	1	3 winds
CIMR-J7□A20P2					
CIMR-J7□A20P4					
CIMR-J7□A20P7					
CIMR-J7□A21P5					
CIMR-J7□A22P2	3.5				
CIMR-J7□A23P7	5.5				

200V Single-phase Input Series

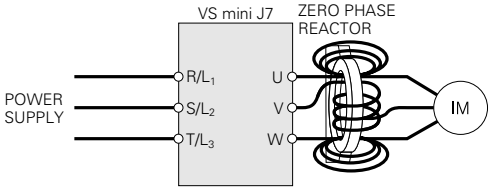
Inverter		Finemet Zero Phase Reactor			
Model	Recommended Wire Size mm²	Model	Code No.	Qty.	Wiring Method
CIMR-J7□AB0P1	2	F6045GB	FIL001098	1	3 winds
CIMR-J7□AB0P2					
CIMR-J7□AB0P4					
CIMR-J7□AB0P7	3.5				
CIMR-J7□AB1P5	5.5				

400V Three-phase Input Series

Inverter		Finemet Zero Phase Reactor			
Model	Recommended Wire Size mm²	Model	Code No.	Qty.	Wiring Method
CIMR-J7□A40P2	2	F6045GB	FIL001098	1	3 winds
CIMR-J7□A40P4					
CIMR-J7□A40P7					
CIMR-J7□A41P5					
CIMR-J7□A42P2					
CIMR-J7□A43P7					

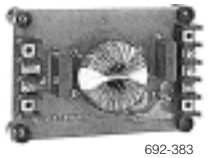
Can be used both for input and output sides of the inverter and effective on noise reduction.

Connection Diagram



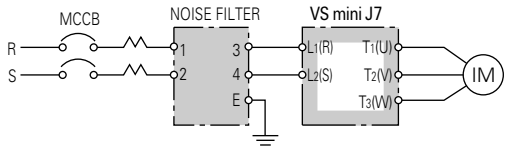
Wind each wire (R, S, T or U, V, W) 3 times around the core.

Input Noise Filter

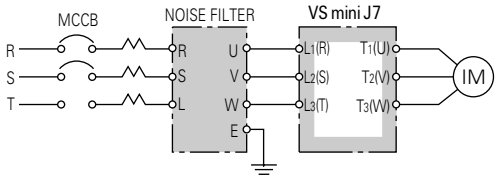


692-383

Example: Single-phase input (Model LNFB)



Three-phase input (Model LNFD)



Noise Filter without Case

Specifications	Max. Applicable Motor Output kW (HP)	Inverter Capacity kVA	Rated Current A	Model	Product Code	Prats Codes No.	Figure No.	Dimensions in mm (inches)						Mounting Screw	Approx. Mass kg (lb)
								W	D	H	A	A'	B		
200V Class (Signle-phase)	0.1 (0.13), 0.2 (0.25)	0.3, 0.6	10	LNFB-2102DY	72600-B2102DY	FIL 128	1	120 (4.72)	80 (3.15)	50 (1.97)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.1 (0.22)
	0.4 (0.5)	1.1	15	LNFB-2152DY	72600-B2152DY	FIL 129	1	120 (4.72)	80 (3.15)	50 (1.97)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	0.75 (1)	1.9	20	LNFB-2202DY	72600-B2202DY	FIL 130	1	120 (4.72)	80 (3.15)	50 (1.97)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	1.5 (2)	3.0	30	LNFB-2302DY	72600-B2302DY	FIL 131	1	130 (5.12)	90 (3.54)	65 (2.56)	118 (4.65)	–	78 (3.07)	M4×4, 20mm (0.79in.)	0.3 (0.66)
200V Class (Three-phase)	0.1 (0.13) to 0.75 (1)	0.3 to 1.9	10	LNFD-2103DY	72600-D2103DY	FIL 132	2	120 (4.72)	80 (3.15)	55 (2.17)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	1.5 (2)	3.0	15	LNFD-2153DY	72600-D2153DY	FIL 133	2	120 (4.72)	80 (3.15)	55 (2.17)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	2.2 (3)	4.2	20	LNFD-2203DY	72600-D2203DY	FIL 134	2	170 (6.69)	90 (3.54)	70 (2.76)	158 (6.22)	–	78 (3.07)	M4×4, 20mm (0.79in.)	0.4 (0.88)
	3.7 (5)	6.7	30	LNFD-2303DY	72600-D2303DY	FIL 135	3	170 (6.69)	110 (4.33)	70 (2.76)	–	79 (3.11)	98 (3.86)	M4×6, 20mm (0.79in.)	0.5 (1.10)
400V Class (Three-phase)	0.2 (0.25) to 0.75 (1)	0.9 to 2.6	5	LNFD-4053DY	72600-D4053DY	FIL 144	3	170 (6.69)	130 (5.12)	75 (2.95)	–	79 (3.11)	118 (4.65)	M4×6, 30mm (1.18in.)	0.3 (0.66)
	1.5 (2), 2.2 (3)	3.7 to 4.2	10	LNFD-4103DY	72600-D4103DY	FIL 145	3	170 (6.69)	130 (5.12)	95 (3.94)	–	79 (3.11)	118 (4.65)	M4×6, 30mm (1.18in.)	0.4 (0.88)
	3.0 (2.2), 3.7 (5)	5.5 to 7.0	15	LNFD-4503DY	72600-D4153DY	FIL 146	3	170 (6.69)	130 (5.12)	95 (3.94)	–	79 (3.11)	118 (4.65)	M4×6, 30mm (1.18in.)	0.4 (0.88)

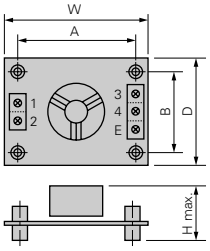


Figure 1
(Single-phase input)

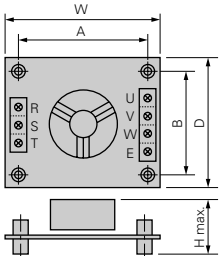


Figure 2
(Three-phase input)

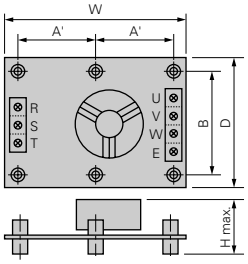
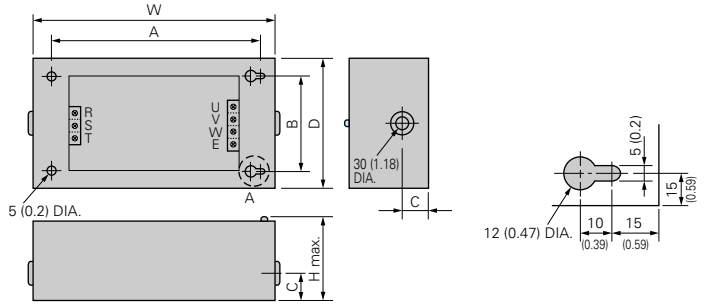


Figure 3
(Three-phase input)

Note: When using CE standard inverters, the special EMC conformed noise filter is required.
Contact your YASKAWA representative.

Noise Filter with Case

Specifications	Max. Applicable Motor Output kW (HP)	Inverter Capacity kVA	Rated Current A	Model	Product Code	Parts Codes No.	Dimensions in mm (inches)						Mounting Screw	Approx. Mass kg (lb)
							W	D	H	A	A'	B		
200V Class (Signle-phase)	0.1 (0.13), 0.2 (0.25)	0.3, 0.6	10	LNFB-2102HY	72600-B2102HY	FIL 136	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.8 (1.77)
	0.4 (0.5)	1.1	15	LNFB-2152HY	72600-B2152HY	FIL 137	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.8 (1.77)
	0.75 (1)	1.9	20	LNFB-2202HY	72600-B2202HY	FIL 138	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.9 (1.99)
	1.5 (2)	3.0	30	LNFB-2302HY	72600-B2302HY	FIL 139	200 (7.87)	105 (4.13)	95 (3.74)	170 (6.69)	75 (2.95)	33 (1.30)	M4×4, 10mm (0.39in.)	1.1 (2.43)
200V Class (Three-phase)	0.1 (0.13) to 0.75 (1)	0.3 to 1.9	10	LNFD-2103HY	72600-D2103HY	FIL 140	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.9 (1.99)
	1.5 (2)	3.0	15	LNFD-2153HY	72600-D2153HY	FIL 141	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.9 (1.99)
	2.2 (3)	4.2	20	LNFD-2203HY	72600-D2203HY	FIL 142	240 (9.45)	125 (4.92)	100 (3.94)	210 (8.27)	95 (3.74)	33 (1.30)	M4×4, 10mm (0.39in.)	1.5 (3.31)
	3.7 (5)	6.7	30	LNFD-2303HY	72600-D2303HY	FIL 143	240 (9.45)	125 (4.92)	100 (3.94)	210 (8.27)	95 (3.74)	33 (1.30)	M4×4, 10mm (0.39in.)	1.6 (3.53)
400V Class (Three-phase)	0.2 (0.25) to 0.75 (1)	0.9 to 2.6	5	LNFD-4053HY	72600-D4053HY	FIL 149	235 (9.25)	140 (5.51)	120 (4.72)	205 (8.07)	110 (4.33)	43 (1.69)	M4×4, 10mm (0.39in.)	1.6 (3.53)
	1.5 (2), 2.2 (3)	3.7 to 4.2	10	LNFD-4103HY	72600-D4103HY	FIL 150	235 (9.25)	140 (5.51)	120 (4.72)	205 (8.07)	110 (4.33)	43 (1.69)	M4×4, 10mm (0.39in.)	1.7 (3.75)
	3.0 (2.2), 3.7 (5)	5.5 to 7.0	15	LNFD-4153HY	72600-D4153HY	FIL 151	235 (9.25)	140 (5.51)	120 (4.72)	205 (8.07)	110 (4.33)	43 (1.69)	M4×4, 10mm (0.39in.)	1.7 (3.75)



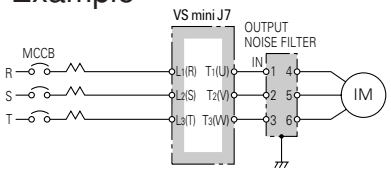
Example three-phase input.

Output Noise Filter

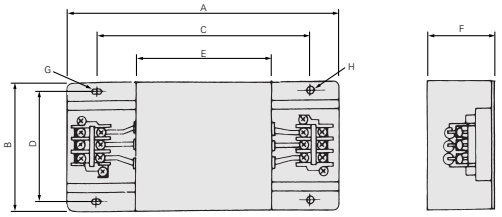
(Tohoku Metal Industries Co., Ltd.)

690-119

Example



Dimensions



Model	Terminal Plate	Dimensions in mm (inches)								Approx. Mass kg (lb)
		A	B	C	D	E	F	G	H	
LF-310KA	TE-K55M4	140 (5.51)	100 (3.94)	100 (3.94)	90 (3.54)	70 (2.76)	45 (1.77)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	0.5 (1.10)
LF-320KA	TE-K55M4	140 (5.51)	100 (3.94)	100 (3.94)	90 (3.54)	70 (2.76)	45 (1.77)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	0.6 (1.32)
LF-310KB	TE-K55M4	140 (5.51)	100 (3.94)	100 (3.94)	90 (3.54)	70 (2.76)	45 (1.77)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	0.5 (1.00)

Specifications

200V Class (Three-phase)

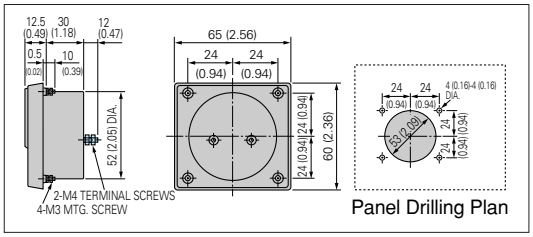
Max. Applicable Motor Output kW (HP)	Inverter Capacity kVA	Model	Rated Current A	Part Code No.
0.1 (0.13)	0.3	LF-310KA	10	FIL 000068
0.2 (0.25)	0.6	LF-310KA	10	FIL 000068
0.4 (0.5)	1.1	LF-310KA	10	FIL 000068
0.75 (1)	1.9	LF-310KA	10	FIL 000068
1.5 (2)	3.0	LF-310KA	10	FIL 000068
2.2 (3)	4.2	LF-320KA	20	FIL 000069
3.7 (5)	6.7	LF-320KA	20	FIL 000069

400V Class (Three-phase)

Max. Applicable Motor Output kW (HP)	Inverter Capacity kVA	Model	Rated Current A	Part Code No.
0.2 (0.25), 0.4 (0.5)	0.9, 1.4	LF-310KB	10	FIL 000071
0.75 (1)	2.6	LF-310KB	10	FIL 000071
1.5 (2)	3.7	LF-310KB	10	FIL 000071
2.2 (3)	4.2	LF-310KB	10	FIL 000071
3.0 (2.2), 3.7 (5)	5.5, 7.0	LF-310KB	10	FIL 000071

Frequency Meter MODEL DCF-6A*, 3V, 1mA : Analog frequency indicating meter is available as an option.

690-121



Scale parts code no.

75Hz full scale: FM000065
60/120Hz full scale: FM000085

∗DCF-6A is 3V, 1mA, 3kΩ.

For VS mini J7 multi-function analog monitor output, set frequency meter adjusting potentiometer or constant n45 (analog monitor output gain) within the range of 0 to 3V (Inilial setting is 0 to 10V).

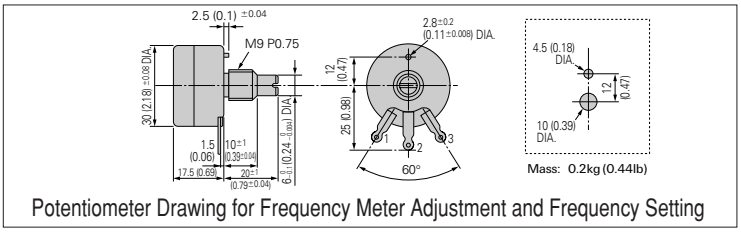
Frequency Setter model RV30YN20S, 2kΩ (Parts code no.: RH000739)

Frequency Meter Adjusting Potentiometer

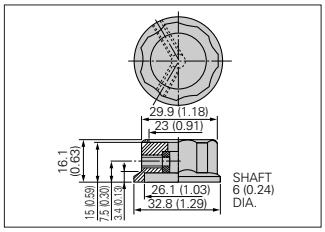
Model RV30YN 20S, 2kΩ: Corrects frequency meter reading. (Parts code no.: RH000850)

Frequency Setting Knob (Model CM-3S)

Used to adjust potentiometer frequency setting.



688-81



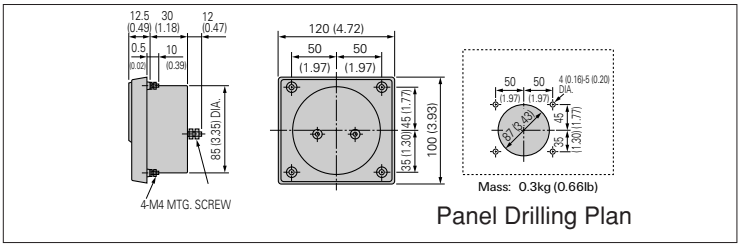
Output Voltmeter (Model SCF-12NH Rectification Type Class 2.5)

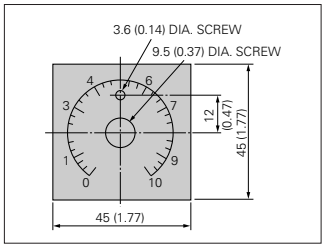
200V Class: 300V full-scale (Parts code no.: VM000481)
400V Class: 600V full-scale (Parts code no.: Output voltmeter: VM000502, Transformer for instrument: PT000084)

Scale Plate

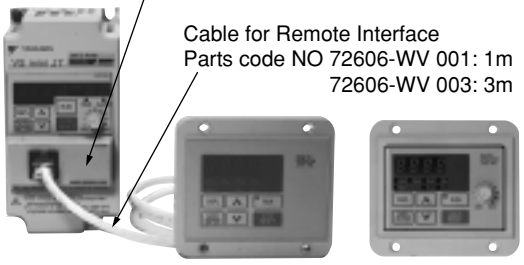
(Parts code no.: NPJT41561-1)

690-166





Digital Operator for Remote Operation (Model JVOP-146/144)
Remote Interface Unit for Remote Operation (Model SI-232/J7)
Interface Unit for Copy Unit (Model SI-232/J7C)

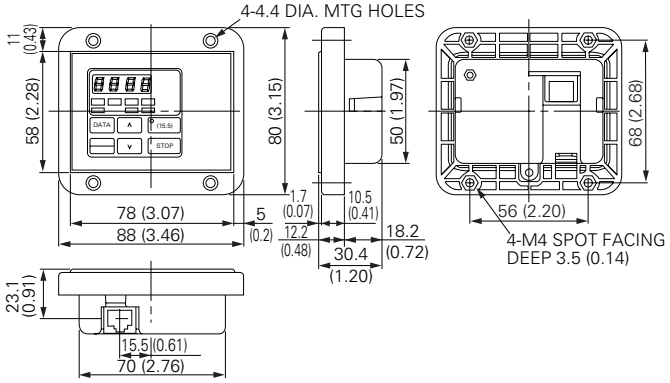


When using digital operator for remote operation (JVOP-146/144) as copy unit, use the SI-232/J7C, which can be easily attached and removed.

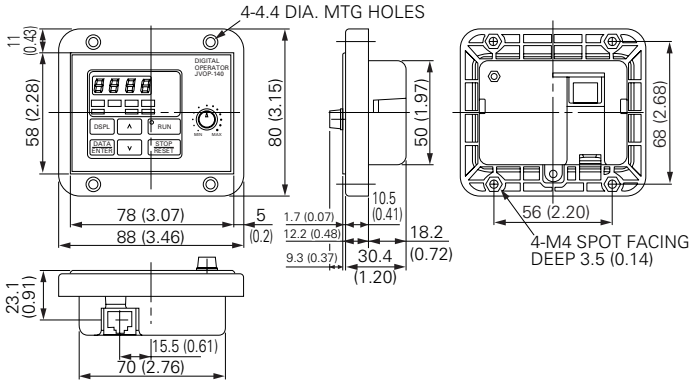
Note : Order digital operater, cable, remote interface separately.

Dimensions in mm (inches)

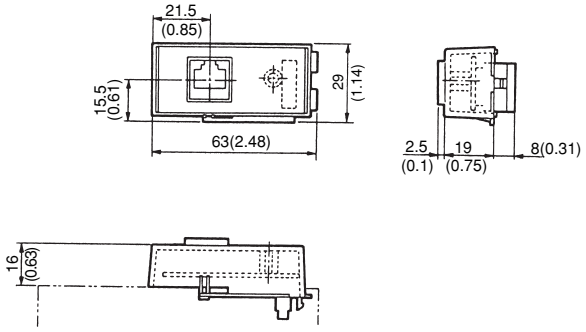
Digital Operator for Remote Operation
(Model: JVOP-146)



(Model: JVOP-144)

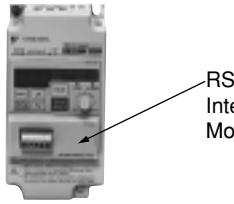


Remote Interface Unit for Remote Operation



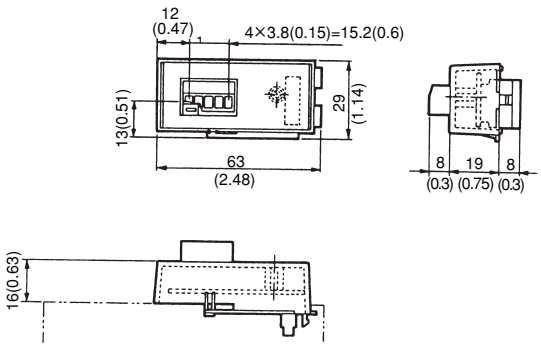
RS-422/485 Interface Unit for MEMOBUS Communication (Model SI-485/J7)

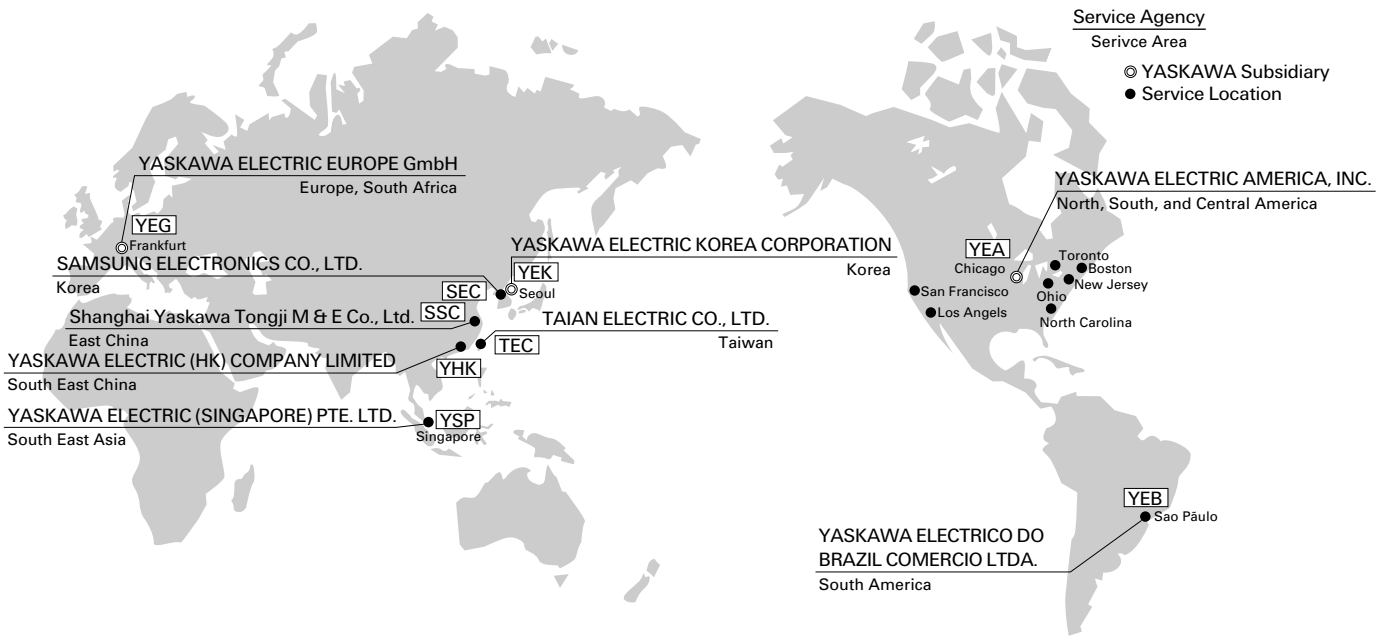
Dimensions in mm (inches)



Communication Cable Connector

Note : The communication cable connector is included with this unit.





Area	Service Area	Service Location	Service Agency ＊: YASKAWA Subsidiary		Telephone/Fax ( ): Country Code
Europe South Africa	All of Europe and South Africa	Frankfurt(HQ) Düsseldorf London France, Italy Spain	YASKAWA ELECTRIC EUROPE GmbH	(YEG)*	Headquarters PHONE (49)-6196-569-300 FAX (49)-6196-888-301
South America	South America	Sao Pãulo	YASKAWA ELÉCTRICO DO BRASIL COMÉRCIO LTDA.	(YEB)*	PHONE (55)-11-825-7723 FAX (55)-11-210-9781
China	Shanghai East China	Shanghai	Shanghai Yaskawa- Tongji M&E Co., Ltd.	(SSC)*	PHONE (86)-21-6531-4242 FAX (86)-21-6531-4242
Hong Kong	Hong Kong South East China	Hong Kong	YASKAWA ELECTRIC (HK) COMPANY LIMITED	(YHK)*	PHONE (852)-2803-2385 FAX (852)-2547-5773
South East Asia	Singapore, Indonesia Thailand, Malaysia Philippines, Hong Kong	Singapore	YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.	(YSP)*	PHONE (65)-282-3003 FAX (65)-289-3003
North America South America Central America	Entire Area	Chicago(HQ) Los Angeles New Jersey Boston San Francisco Ohio	YASKAWA ELECTRIC AMERICA INC. (Chicago HQ)	(YEA)*	Headquarters PHONE (1)-847-887-7094 FAX (1)-847-887-7070
Korea	Korea	Seoul	YASKAWA ELECTRIC KOREA CORPORATION	(YEK)*	PHONE (82)-2-776-7844 FAX (82)-2-753-2639
			SAMSUNG ELECTRONICS CO., LTD.	(SEC)	PHONE (82)-2-331-200-2981 FAX (82)-2-331-200-2970
Taiwan	Taiwan	Taipei	TAIAN ELECTRIC CO., LTD.	(TAIAN)	PHONE (886)-2-2511-1181 FAX (886)-2-2563-8854

VS mini J7

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice
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LITERATURE NO. KAE-S606-12E
Printed in Japan June 2003 98-12 ◈9
03-4③